Published every Saturday by the Simmons-Boardman Publishing Company, 34 North Crystal Street, East Stroudsburg, Pa., with executive offices at 30 Church Street, New York

All communications should be addressed to the New York Office, 30 Church Street

EDWARD A. SIMMONS, *President*
LUCIUS B. SHERMAN, *Vice-Pres.*
HENRY LEE, *Vice-Pres.*
SAMUEL O. DUNN, *Vice-Pres.*
CECIL R. MILLS, *Vice-Pres.*
FREDERICK H. THOMPSON, *Vice-Pres.*
ROY V. WRIGHT, *Sec'y.*
JOHN T. DEMOTT, *Treas*

CHICAGO:
105 West Adams St.

WASHINGTON:
17th and H Streets, N. W.

CLEVELAND:
Terminal Tower

SAN FRANCISCO
215 Market St.

Editorial Staff

SAMUEL O. DUNN, *Editor*
ROY V. WRIGHT, *Managing Editor*
ELMER T. HOWSON, *Western Editor*
H. F. LANE, *Washington Editor*

B. B. ADAMS
C. B. PECK
W. S. LACHER
ALFRED G. OEHLER
F. W. KRAEGER
E. L. WOODWARD
J. G. LYNE
J. H. DUNN
D. A. STEEL
R. C. AUGUR
R. A. DOSTER
JOHN C. EMERY
MARION B. RICHARDSON
H. C. WILCOX
R. S. KENRICK
NEAL D. HOWARD
RICHARD W. BECKMAN
LLOYD GEORGE
CHARLES LAYNG
GEORGE E. BOYD
WALTER J. TAFT
GARDNER C. HUDSON
M. H. DICK
W. J. HARGEST

The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.)

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free; United States, Mexico and Canada, $6.00. Foreign countries, not including daily editions $8.00.

Subscriptions for the fourth issue each month only (published in two sections, the second of which is the Motor Transport Section) payable in advance and postage free; United States, Mexico and Canada, $1.00; foreign countries, $2.00. Single copies, 25 cents each.

Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name Registered U. S. Patent Office.

Vol. 88 March 22, 1930 No. 12

In this Issue

Construction Procedure for Electrification of Railroads Page 674

J. V. B. Duer, electrical engineer of the Pennsylvania, outlines a method of planning which avoids delays, conflicts and the necessity of rebuilding parts of the installation.

New Haven Completes Its Come-Back 678

With 1929 earnings of $11.72 on its common stock and a dividend rate of 6 per cent, this company is now in a strong position to face other problems.

Canadian National Plans Extensive Improvements at Montreal 681

A description, with maps, of this road's plans for a new $50,000,000 passenger terminal, grade separation and air right development.

EDITORIALS

Passenger Traffic Trends 671
Bringing a New Point of View to the Railroad 671
Increasing the Prosperity of the Railroads' Patrons 672
Planning for Electrification 672
Express Agency Possibilities 673
Possibilities in Refinements of Design of Locomotives 673

GENERAL ARTICLES

Construction Procedure for Electrification of Railroads, by J. V. B. Duer 674
New Haven Completes Its Come-Back 678
Freight Car Loading 680
Canadian National Plans Extensive Improvements at Montreal 681
Austrian 2-8-4 Locomotive of Unique Design, by Dr. A. Giesl-Gieslingen 685
Electrification Projects Discussed by Engineers 689
Commodity Values and Freight Rates, by M. O. Lorenz 690
"Reciprocity" Hearings Resumed in Washington 693
Selling Railway Transportation in Great Britain, by C. G. Dandridge 695

COMMUNICATIONS AND BOOKS 698
LOOKING BACKWARD 699
ODDS AND ENDS OF RAILROADING 700
NEWS OF THE WEEK 701

The Railway Age is indexed by the Industrial Arts Index and also by the Engineering Index Service

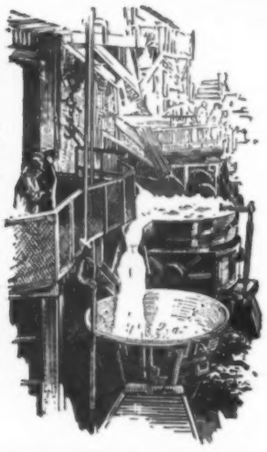
Alloy Steel

Reduces Spare Parts Investment

EXTENSIVE use of Alloy Steel has brought about a new order of things in American Industry. An instance of this is the reduction of spare parts inventories enabled by the longer life and dependable performance typical of parts made of Alloy Steel.

In Alloy Steels you can have equipment with multiplied resistance to wear, corrosion, heat, acids or shock. You can have equipment with superior physical properties. You can have long machine life under the most severe operating conditions.

Alloy Steel assures minimum interruption of production for repairs. It should be carefully considered for any part that wears out or breaks before the equipment itself becomes obsolete. Electromet engineers will gladly explain how the above results may be obtained by the use of Ferro-Alloys in Alloy Steel.



Inquiries Invited

ELECTRO METALLURGICAL SALES CORP.

Unit of Union Carbide UCC *and Carbon Corporation*

Carbide and Carbon Building, 30 East 42nd Street
New York, N. Y.

Electromet
Ferro-Alloys & Metals

Railway Age

Vol. 88, No. 12 March 22, 1930 Table of Contents Appears on Page 5 of Advertising Section

Passenger Traffic Trends

TRAFFIC statistics for 1929, which have just been issued by the Interstate Commerce Commission, show that the downward trend in passenger business, which started in 1921 and has continued without a break except for the single year of 1923, is still in progress. After a marked upward tendency which has prevailed from the inception of railroad operation in this country, passenger traffic reached its peak in 1920 in passengers carried, in passenger-miles and in passenger revenue. In 1929, as compared with 1920, there were reductions of 37 per cent in the number of passengers carried, of 34 per cent in passenger-miles and of 32 per cent in passenger revenue.

From the trends existing up to 1920, the railways at that time might reasonably have expected still further increases in their passenger business. But disregarding this probability, if the passenger traffic and earnings had only been maintained at the 1920 level during the last nine years, the railways would have carried 3,041,000,000 more passengers than they actually did carry, would have carried 107,000,000,000 more passengers one mile, and would have earned $2,300,000,000 more in passenger revenues. In other words, losses in passenger traffic below the 1920 level which have occurred in the last nine years have cost the railways these amounts of traffic and gross earnings. In this period the average citizen has made 26 fewer rail trips and has traveled 930 fewer miles on the railways than he would have if the 1920 level had been maintained.

Figured on the volume of traffic handled in 1920, these aggregate reductions in nine years have been equivalent to a loss of 30 months' business in the number of passengers carried, to losing 27 months' business in terms of passenger-miles, and to losing 21 months' business in passenger revenues. The aggregate losses for the nine years amounted to almost four times the total number of passengers carried in 1929, to 3.4 times the passenger-miles, and to 2.6 times the passenger revenues of that year. In the light of the foregoing losses in passenger business, current reductions in freight traffic, and the uncertainties of consolidation, it is obvious that large capital expenditures for new passenger facilities, demanded in many localities, must receive most careful scrutiny.

There is one encouraging fact, however, shown by the 1929 figures. While the losses continued for the sixth consecutive year, the reduction in the number of passengers carried was the smallest since 1923, while the loss in passenger-miles, although greater than in 1925 and 1926, was roughly only one-third as large as in 1927 and only one-fourth as large as in 1928. It is possible, therefore, that the roads may be approaching the bottom of the decline and that a more favorable trend may be just around the corner.

Bringing a New Point of View to the Railroad

THE recent appointment of Sir Harold Hartley as vice-president and director of scientific research of the London, Midland & Scottish (Great Britain) is a matter of more than passing interest, both as a further manifestation of this company's policy of filling some of its high executive positions with men distinguished for achievements outside the railroad field, and as an indication of the importance which it attaches to the value of highly developed and carefully supervised scientific research in successful railroad operation.

Not long ago, the L. M. S. chose as its president Sir Josiah Stamp, a noted economist. Now the same company has selected as a vice-president a professor of science from Oxford University. It is true, of course, that Sir Harold's standing in his own profession is of the highest. It is equally true that a distinguished war record, a directorship in at least one large industrial concern and membership on various government industrial committees have combined to give him a thorough knowledge of the needs of industry in general and of the ways in which applied scientific research may be made to serve industry. Nevertheless, he is not a railroad man. If, therefore, his position were to be wholly an executive one within any of the recognized departments, it would be necessary, however distasteful, in considering the implications of his appointment, to agree with Modern Transport (London), when that paper says, editorially: "The unpalatable truth may have to be faced that for the most important posts the scientist or the trained administrator may be more suitable than one who has spent thirty years within the comparatively restricted confines of the railway service."

But it has been officially stated, says the same writer, that " 'an advisory council of eminent scientists is to be set up under his chairmanship,' and that his activities will embrace the 'chemical, metallurgical and physical sides of the organization,' in addition to supervisory duties over engineering projects." Consequently, it would seem that his appointment may be taken as well

in keeping with the ideas of Sir Josiah Stamp, that "in every department and business there should be some minds set aside for considering change and improvement, and for experiment," and that "between the several separate scientific fields of each kind of transport there is often not too clear and clean a contact." Following out these ideas, the Railway Gazette (London), seems to have found the true spirit of the appointment, when it says, editorially: "The largest British railway organization is, for the first time in history, to have a guide of the highest scientific standing to co-ordinate and direct the efforts made towards improving railway transport in all phases . . . . There should be abundant scope for inquiry along scientific lines as distinct from the investigations of practical men."

This, unquestionably, is Sir Harold's real status—a guide to direct scientific measures for the improvement of railway service, who will do his work not in competition but in co-operation with railway men. He is a new type of railway officer, and a representative of a type which must, because of the qualifications required, be drawn from outside of the railroad ranks, but which enters railway service to aid, and not to displace, men experienced in practical railroad work.

Increasing the Prosperity of the Railroads' Patrons

AUSUALLY astute observer sees, in the acquisition of important coal distributing agencies by interests affiliated with railroads serving the coal-producing areas which supply these distributors, a possible step toward bringing improved conditions to the coal industry, which of late years has been none too prosperous. The logic behind the opinion seems sufficiently clear. Coal consumption has been curtailed, to some degree at least, by the competition of oil, natural gas and, to some extent, by electricity, which have been efficiently merchandised by wide-awake public utility and oil companies. These companies usually control the product all the way from actual production to the ultimate consumer, being thus enabled to maintain a uniformity of service which lends itself to effective merchandising. With one financial control over mines, transportation and distributing agencies, it is argued, the same kind of uniform service could be offered with coal as its competitors now enjoy. Furthermore, more efficient distribution might make for lower costs and a consequent increase in consumption.

Whether or not the theory advanced is wholly factual, it nevertheless is quite plausible and logical. The railroads have done yeoman's service for their agricultural patrons and for themselves by promoting the raising of new crops and of improved breeds of livestock. Prosperous shippers make prosperous railroads. If any of a railroad's patrons are not producing as much as they might if their methods were improved, then it is to the railroad's advantage to guide them to the changes which will make them better patrons.

It is customary for railroad men to look upon their service as the principal part of transportation, and this is usually the correct viewpoint as far as gross movement is concerned. From a standpoint of cost, however, for many industries the railroad charges are but a fraction of the total transportation cost—which must include handling within the factory, the cost of boxing and crating and truck haul at point of origin and destination. How many shippers are there who feel that their transportation costs are too high, and who look solely to the railroads for relief, who could effect savings in total transportation expenses greater than the entire railroad charge by a better organization of their trucking operations and factory handling methods? Could not the railroads, by an effort to effect a closer co-ordination between truck handling and train service save their shippers great sums, thus earning their good will and increasing the tonnage of their shipments, while maintaining the level of freight rates?

Modern industry in a highly competitive era has developed the idea of service to the consumer to a high degree of effectiveness. Engineering studies and service are provided to make the product meet the individual needs of the purchaser. Such service to customers has clearly shown its profitability in other industry. Might not the wider application of a similar plan be profitable in the field of transportation? If so, the predominant transportation agency—the railroads—is the logical leader for such an undertaking.

Planning for Electrification

MUCH has been said and a great deal printed as to reasons for adopting electric traction and concerning the results obtained in specific cases. Very little information is available, however, as to plans of procedure. Such plans should be laid before the decision to electrify is reached and carried through until the work is completed. Preliminary planning will anticipate and dispose of many difficulties which may be caused by insufficient clearances, inductive interference, location of catenary structures or substations, etc.

Preliminary plans must be followed by drawing up a working schedule. In some instances these things are done by consulting engineers and in others by the railroad's own forces. In either case there are a number of men in the service of the railroad who should know and clearly understand the requirements, since the installation of an electrified section involves all departments. An excellent opportunity to learn the gist of these requirements, as they affect the construction of the overhead and substations, is contained in an article on construction procedure for railroad electrification by J. V. B. Duer, in this issue. It gives a simplified picture of a working schedule, the understanding of which, by all concerned, will facilitate construction.

Express Agency Possibilities

POSSIBILITIES for joint railway utilization of the organization and facilities of the Railway Express Agency, Inc., have been pointed out from time to time in the *Railway Age*. In the issue of September 28, 1929, for example, an editorial reviewed the operations and outlined the status of freight forwarders or consolidating companies. Therein it was suggested that if the consolidator be a necessary functionary in the transport scheme of the country then the Railway Express Agency might well add the function to its present activities. Under such a plan, it was pointed out, any profit or economy resulting from consolidated l.c.l. freight operations would accrue to the railways, as it logically should.

Recently has come a more widespread discussion of the possibilities for the utilization of the Express Agency as a joint railway freight trucking enterprise in a nation-wide plan for the co-ordination of rail and highway freight service. The January 25 issue of the *Railway Age*, Motor Transport Section, included an article entitled "Our Largest Truck Operator—The Express Agency", which described the organization and facilities of the Railway Express Agency and suggested the possibility of expansion to handle freight for the owning railways. This article revealed that on December 1, 1929, the Express Agency owned 8,941 highway vehicles distributed throughout the country.

And now comes the traffic executive of a large industrial enterprise with a suggestion similar to the foregoing. In the news department of Section II, the Motor Transport Section of this issue of *Railway Age*, appears an item reporting a recent address delivered by George F. Hichborn, general traffic manager, United States Rubber Company, before the Traffic Club of New York. While Mr. Hichborn's address was concerned mainly with proposals for store-door collection and delivery of railway freight on Manhattan Island, New York, he nevertheless carried the thought further and cited the possibilities in the Express Agency as follows:

"Following through the thought of national delivery service as an accessorial carrier service, let me remind you that the carriers now own and operate the Railway Express Agency, Inc. With its large fleet of trucks and experienced personnel it is reasonable to assume that it can, as need arises, quickly expand this service by adding to present equipment when and where found necessary. It would then be possible for the vehicles to be used jointly in express and freight cartage service, always under the direction of the carriers, thus reducing to a minimum the expenses entailed with a maximum service to shipper and carrier."

This appears to be a reasonable deduction, for the railways, it would seem, do have in the Express Agency a ready-made weapon with which to fight the competition of independent truck lines if and when sound railway policy dictates the desirability of co-ordinating rail and highway freight service on a national scale.

Possibilities in Refinements of Design of Locomotives

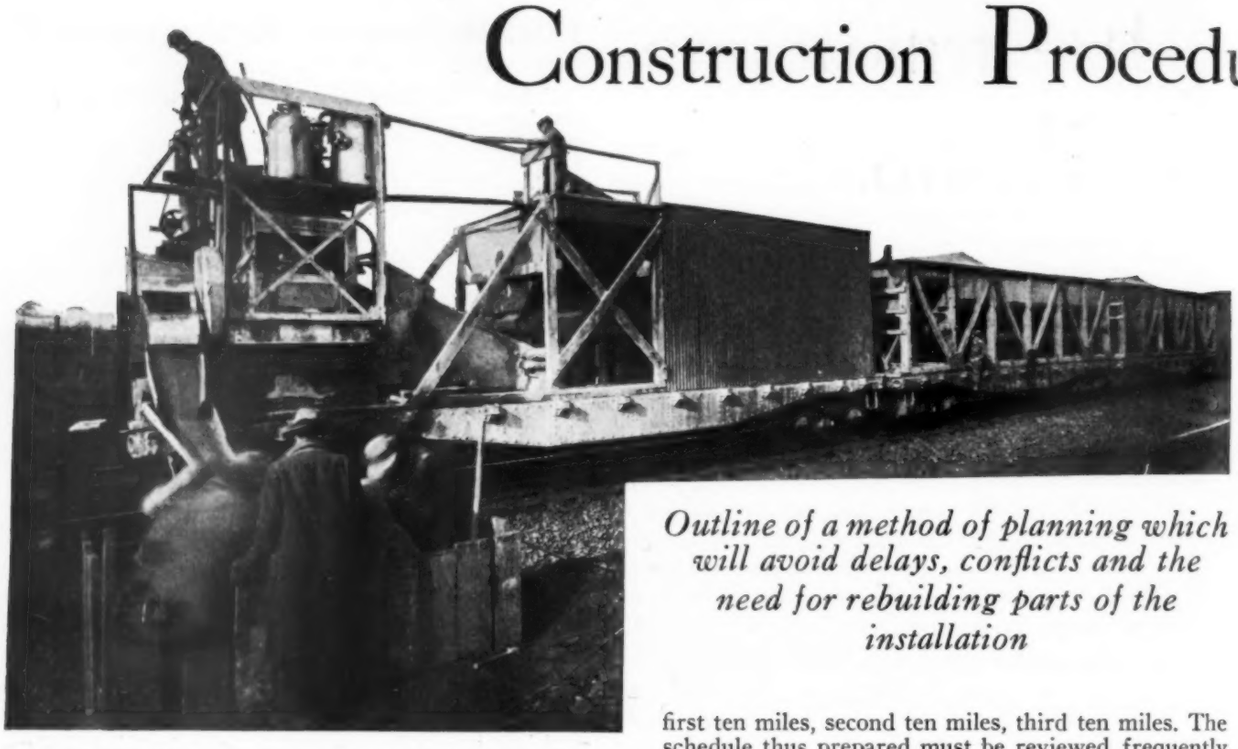
MOST of the characteristic difference between American and European locomotives may be accounted for by differences in economic conditions affecting locomotive operation and maintenance. The relatively high axle loads customarily employed in America have permitted the development of rugged designs. The relatively high cost of labor in America has been a factor in discouraging the development of certain refinements which, on casual inspection would seem to require more care and attention in their construction and maintenance than American railroads care to undertake.

In an article elsewhere in this issue Dr. A. Giesl-Gieslingen, who is familiar with Austrian locomotive practice, describes the measures adopted by the Austrian Federal Railways in the development of a passenger locomotive to deliver 2,500 cylinder horsepower, with axle loads limited to 40,000 lb. The author pays tribute to the value of the stiff frame system available to the American designer in the form of the unit bed casting, and it is interesting to note that the Austrian Railways have followed American practice, as far as conditions would permit, in developing a stiff frame system as a means of reducing running-gear maintenance.

It is of even greater interest, however, to note the close tolerances employed in the working fits and the effect on maintenance of refinements in the design of working parts to which little attention is given in America. The fitting of driving boxes with a clearance of 1/120 in. in the pedestals is almost beyond the comprehension of designers whose experience has been confined to American practice. The use of the equivalent of a universal joint in side- and main-rod bearings to permit uniform distribution of bearing pressure, irrespective of irregularities in the working alinement of parts, except on the crank pins of driving wheels fitted with lateral-motion journal boxes, is a refinement the need for which is not imperative with the loose fits characteristic of American locomotive practice.

When it is considered, however, that the crank-pin bearing in a main rod designed to permit universal motion of both the crank-pin and crosshead-pin bearings, carrying a piston load of over 107,000 lb., has developed a wear of but .005 in. on the diameter of the crank-pin bearing in 20,000 miles of road service and that this locomotive, with characteristically close fits throughout the running gear, develops a machine efficiency, including air resistance and tender resistance, of from 86 to 91 per cent when developing its maximum horsepower, at 45 to 50 miles an hour, is it not pertinent to ask whether such close tolerances and mechanical refinements do not possess possibilities for the improvement of the economic value of American locomotives? According to European standards, a new American locomotive is half worn out before it performs a mile of service.

Construction Procedure fo



Concrete Train at Work on Foundations Along the Right-of-Way

Outline of a method of planning which will avoid delays, conflicts and the need for rebuilding parts of the installation

THIS paper is intended to present a general summary of procedure in the electrification of a section or division of a major steam railroad. It is not intended to be a discussion for or against any particular type or system of electrification. Neither is it concerned with the various decisions that determine the section to be electrified, electrical characteristics to be reproduced in the section, voltage and current to be used, the type and characteristics of the overhead systems, etc. We are assuming that all details of general design, such as hardware, conductors, general wiring, schematics, substation layout and questions of this type have been definitely decided. The subject narrowed down in this manner, we may proceed with our outline.

Preparation of a Working Schedule

One of the first considerations to be met is the preparation of a properly systematized working schedule. This schedule should show the beginning and completion of all design plans; the dates for placing of material orders and deliveries desired, and the beginning and completion of each of the general divisions of the construction work. From it can be determined the size of construction forces necessary to meet the dates designated, the number of inspectors necessary properly to follow the work, and the number and types of work trains, concreting trains, derrick trains, wire trains and other construction equipment which will be required on the job. The more detailed this schedule is made within reasonable limits, the more assistance it will be toward arranging and planning the various portions of the project.

A convenient form of subdividing this schedule is to prepare it in two separate outlines, one covering the substations detailed as to each individual substation, and the other covering work along the right-of-way properly divided upon a mileage basis, as for example, first ten miles, second ten miles, third ten miles. The schedule thus prepared must be reviewed frequently to determine that all phases of the work are progressing properly. Any variation from this schedule must be carefully considered to determine if it is a logical variation and what effect it will have on the completion of the job as a whole. If it is found on this review that the variation will affect the date of completion, special efforts must be made at once to offset this effect. This can often be done by increasing the working forces, use of additional equipment, or as a last resort, overtime hours.

In addition to the above scheduling, a progress chart periodically posted will provide a convenient method of obtaining a quick check on the work completed to date and the work remaining to be done prior to completion. A simple and convenient type of progress chart is shown on one of the following pages.

Each natural division of the total job is equated on the basis of its percentage of the total work involved. A cross-section sheet is used with the ordinates divided into these natural divisions of work shown in per cent of the total 100 per cent, as for example, catenary foundations, 15 per cent; steel erection, 15 per cent; catenary wiring, 25 per cent, etc.

The abscissas are also divided on a percentage basis and the chart filled in solid, weekly, to show in a graphic manner the proportion of the total of each division of work completed weekly.

Communication Lines

There are several items of work which it is extremely desirable to have completed prior to the actual field work on the electrification proper. One of these is the placing of communication lines, signal control wires and secondary power lines underground. This is not always necessary or desirable, particularly in branch line territory; but where it has been decided to do this, it is extremely important to remove the overhead wire systems prior to the steel erection. In most cases these wires are installed so close to the track that they present physical obstruction to the erection of poles, signal bridges, etc.

* Paper delivered before the New Haven, Conn., section of the American Institute of Electrical Engineers, February 19, 1930.

for Electrification of Railroads*

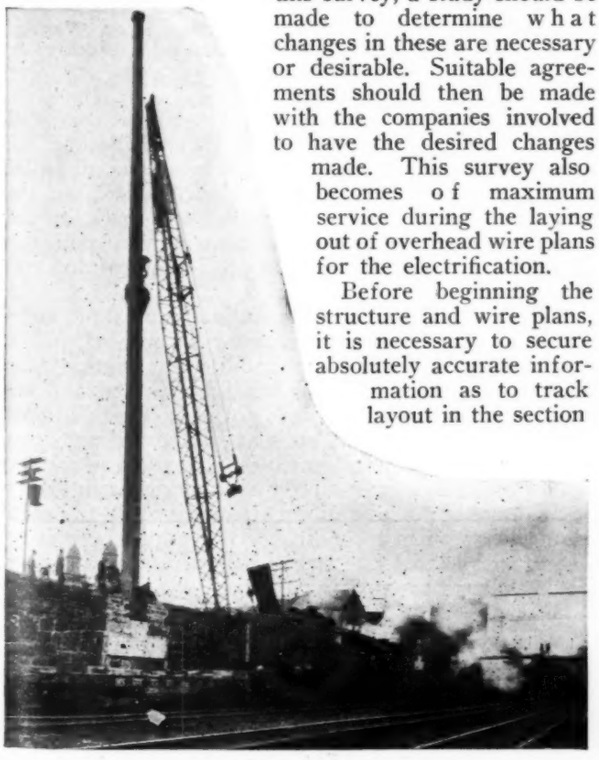
By J. V. B. Duer

Electrical Engineer, Pennsylvania Railroad

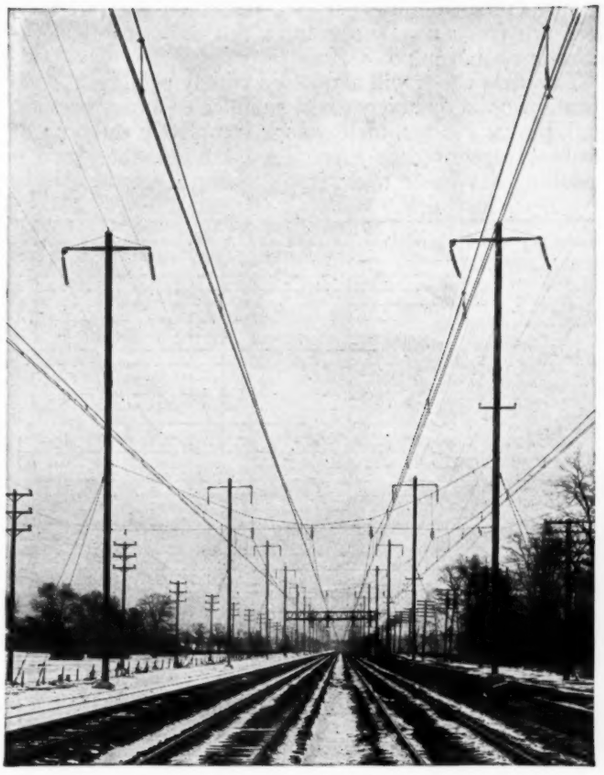
Another item of work that should be completed prior to electrification, or in the early stages of the construction work, is the providing of adequate overhead clearances in tunnels and underneath overhead bridges and any other type of obstruction which may exist. This question of establishing and obtaining adequate clearance frequently becomes one of the major jobs to be performed and an item of considerable expense. It requires a careful balancing of the requirements for electrical clearances and clearances necessary for transportation purposes against the cost of obtaining same. Final decisions on the individual locations should be agreed to by the operating department, motive power department, transportation department, electrification department and maintenance of way department. The clearance finally agreed upon should be obtained prior to the installation of the electrification to prevent even a temporary restriction being placed upon traffic movement.

There should also be made a detailed survey of present and future foreign wire crossings and parallelisms which should show locations, elevations, space occupied, voltage and ownership of each crossing. From this survey, a study should be made to determine what changes in these are necessary or desirable. Suitable agreements should then be made with the companies involved to have the desired changes made. This survey also becomes of maximum service during the laying out of overhead wire plans for the electrification.

Before beginning the structure and wire plans, it is necessary to secure absolutely accurate information as to track layout in the section to be electrified, with details properly located. This is usually done by making a continuous track survey throughout the section, recording the results of the survey on drawings made over the valuation plans of the district. These valuation plans are available on all railroads and show the track layout on 100 feet to the inch scale. It is, however, necessary to check the information shown, and for purpose of electrification add additional details desired, together with a continuous enumeration.



Heavy Capacity Derrick Being Used for Installing Special Pole Inserted In a High Wall



Cross Catenary Construction on Tangent Track

The top of rail profile should also be plotted. The elevations shown should be on the basis of 100-foot stations, determined with reference to the low rail of the track selected as the enumeration track. The low rail is taken to eliminate the effect of superelevation of outer rail on curves.

Location of Catenary Supports

The track plan thus prepared can now be turned over to the engineering office for the preliminary location of cross bridges. The cross bridge spacing is made on the basis of balanced half spans with the poles located as close as physical conditions permit to the desired span lengths. This bridge spacing will be affected by the location of existing overhead bridges, undergrade bridges, buildings, sidings, grade crossings, restricted right-of-way and other items of a similar type. Foreign wire crossings frequently cause the selections of special designs.

The track plan when marked up to show preliminary location of poles, must be then field checked carefully to determine the desirability of installing foundations and poles in the locations shown. Not only must they be checked for obstructions that may be encountered for the location of foundations and poles, but a detailed check should be made to determine conditions existing between the poles. Obstructions, such as pro-

jecting cliffs, buildings, stacks, restricted right-of-way, etc., are frequently encountered not only at pole locations but between poles.

This field check will almost invariably result in the relocation of a relatively large number of cross bridges, and, in many cases, may change completely the type of cross bridge originally proposed. After the changes resulting have been taken into account, the span lengths

Catenary and Transmission	Section Number One				Section Number Two				Section Num
	1st. 10 Miles	2nd. 10 Miles	3rd. 10 Miles	4th. 10 Miles	1st. 10 Miles	2nd. 10 Miles	3rd. 10 Miles	4th. 10 Miles	1st. 10 Miles	2nd. 10 Miles	3rd. Mi
Catenary Bridges											
Track Survey to Engineer											
Cross Section to Engineer											
Chord Survey											
Maps to Real Estate Dept.											
Erection Dwg. O.K. for Foundations											
Start Excavation for Foundations											
Complete Catenary Foundations											
Poles and Cross Beams Dwgs. B.M for Purchase											
Crossarms-Pole Fittings-Dwgs. B.M. for Purchase											
Foreign Wire Crossings Information											
Real Estate Purchase											
Poles and Cross Beams-Fabrication Dwgs.											
Cross Arms Fabrication Dwgs.											
Erection Diagrams O.K. for Steel											
Start Erection Steel											
Catenary Attachments to O.H. Bridges Installed											
Steel Erection Complete											
Catenary and Transmission Wiring											
Wire and Ins. Dwgs. B.M. for Purchase											
Catenary Hardware Dwgs. & B.M. for Purchase											
Trolley Hanger Purchase											
Trolley Hanger Tabulation											
Erection Diagrams O.K. for Catenary											
Wiring Plans and S.S. Tie ins											
Start Wire Work Transmission											
Start Wire Work Cross Span											
Start Wire Work Messenger											
Start Wire Work Auxiliary and Trolley											
Complete Wire Work											
Structure and Track Bonding											
Signal Dept. Data to Engineer											
Structure Bonding Drawings											
Track Bonding Drawings											
Start Bonding											
New Track Rail Complete											
Substations	No. 1	No. 2	No. 3	No. 4	No. 1	No. 2	No. 3	No. 4	No. 1	No. 2	N
Substation Foundations and Steel											
Foundation Dwgs. Complete											
Start Excavation											
Foundations Complete											
Steel-Dwgs. and B.M. for Purchase											
Steel Fabricating Dwgs.											
Steel Erection to Start											
Steel Shipment Complete											
Steel Erection Complete											
Substation Apparatus											
Transformers, Switching Apparatus Control Spec.											
Apparatus to be ordered											
Load Data											
Apparatus Drawings											
Control and Relay Report											
Control and Relay Boards-Dwgs.											
Control and Relay Boards-Wiring Diagrams											
Shipment of Apparatus-Start											
Shipment of Apparatus-Complete											
Substation Wiring, Etc.											
Wire Ins. & Hardware Dwgs. and B.M. for Purchase											
Fence Dwgs. and B.M. for Purchase											
Lighting Dwgs. and B.M. for Purchase											
Piping Dwgs. and B.M. for Purchase											
Disc Switches to be delivered											
Installation of Wiring and Apparatus to Start											
Installation of Wiring and Apparatus Complete											
Signal Set Information											
Foundations Complete											
Steel Dwgs. and B.M. for Purchase											
Steel Fabricating Dwgs.											
Steel Delivered											
Steel Erection Complete											
Substation Site											
Selection Complete											
Real Estate Maps											
Real Estate Purchased											
Start Preparation of Site											
Start Electric Operation											

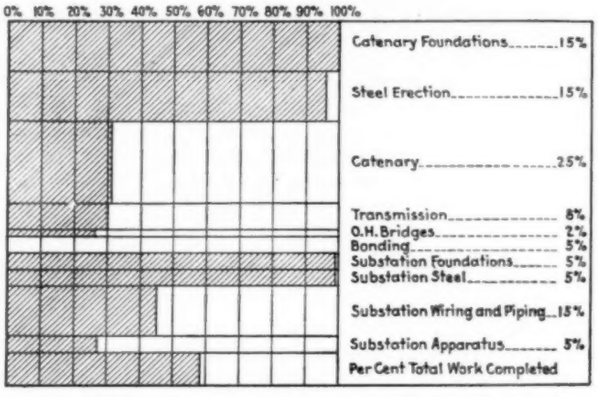
Typical Chart for Showing Completion Dates of Various Items

must again be balanced and the new locations in turn field checked. In this way, it may be necessary to consider three or four arrangements before the final locations are determined. An experienced and resourceful man on the first field check can save both time and expense by the ability to select the proper sites for the individual cross bridges and make a proper balance of span lengths, etc.

With the poles finally located, it then becomes necessary to take detailed cross sections at each of the pole locations. It is also desirable at this time to make an accurate chord survey of the tracks to be electrified, using the bridges selected as the chord points.

Working from the field data now available, the drafting room can prepare cross section plans showing foundations and bridges. These plans should also show track spacing, elevation of top of foundations and pole separations. All dimensions may be determined from the center line of the railroad and from the elevation of the top of the reference rail. On this plan also should be shown the type of bridge, whether cross catenary, cross beam, truss bridge, or signal bridge. If of the cross catenary type, the guys should be shown.

If the various types of pole foundations to be used along the right-of-way have been standardized, as they should be, these plans should show the types of foundations used; also the position of all wires and attachments. These cross section plans should then be taken and field checked to insure that the installation can be made as shown without encountering difficulties that cannot be satisfactorily met. If the plans successfully pass this check, they are satisfactory for the construction of foundations by the field forces and this work



Progress Chart Showing How Information on Various Portions of the Work is Summarized for a Weekly Check of Its Progress

can be started. If not, they must again be corrected before releasing them for construction. Before the actual digging for foundations can be started, it is, of course, necessary to have a field party stake out the foundations and guys on the ground, and mark, on the adjacent rail, the distance out to center line of pole, top of foundation, elevation and out to bottom of foundation.

If during the course of foundation installation, additional changes are found necessary because of underground obstructions or other conditions encountered, the approved drawings applying must be revised and reissued. This is vital, for if it is not done, the additional plans yet to be prepared, such as steel drawings, cross span drawings, catenary drawings, etc., all of which are based on these cross section spans, may contain errors that will not be found until an attempt is made to install the steel or wiring in the field. Discovery of errors or inaccuracies at this late stage in the electrification project is embarrassing to say the least.

Construction of Overhead

Detailed plans for the poles, trusses, signal bridges, cross arms, brackets, etc., can now be released to the manufacturers. Cross span wires, insulators, fittings, hardware details, all of the many items necessary for the completion of the major construction job, can be requisitioned and deliveries determined. From the de-

livery dates obtained, a recheck of the original schedule should be made. The time available after the delivery of the various items, determines the amount of time available for completion of the various classes of work. On the basis of this time available must be decided the number of work trains, derricks, wire trains, etc., that must be used to complete the work at the proper time. Just as soon as sufficient field information is available in the engineering office, the overhead wire plans should be under way and pushed as rapidly as possible without sacrificing accuracy or efficiency.

Past experience indicates that the overhead catenary work is the determining factor in the completion of an electrification project. For this reason, no avoidable delays on this phase of the work should be permitted.

Substations and Sectionalizing Points

Consideration of the power supply portion of an electrification involves largely a discussion of substation installations, since the present tendency seems to be to purchase, from one or more power companies, the electrical energy desired.

The locations for the substations are determined by consideration of a number of different phases vitally affecting their locations. Of these, the most prominent are voltage regulation desired, distribution of loading, possible inductive effects, proximity to natural sectionalizing points, such as interlockings, convenient points for installation of suitable control, and finally real estate available or purchasable. After these various points have been properly weighed and the decision reached as to the location of each individual substation, a sufficient number of cross sections must be taken to determine elevation desired for ground line, tops of foundations and natural or artificial drainage arrangement.

The foundations can usually be installed most conveniently and least expensively at the same time the foundations along the right-of-way are being installed adjacent to the substation site. The erection of substation steel can in most cases very conveniently be taken care of by some type of caterpillar tractor capable of moving itself to various locations on the substation site.

One particular phase of the substation installation that has required considerable study, has been the location and connecting in of a suitable service track. Where possible, the connection to the adjacent main line track should be made with a trailing point switch and the siding track extended approximately through the center of the substation. This cannot always be done because of difference of elevation of the main line tracks and the substation elevation. Where this difference becomes serious, a servicing track between the substation and the main line tracks is a possible solution. In this case, the transformer tracks can be extended to a point adjacent to the servicing track by the use of retaining walls or cribbing. The major pieces of apparatus can then be lowered from the servicing track to the transformer track by the unloading derrick.

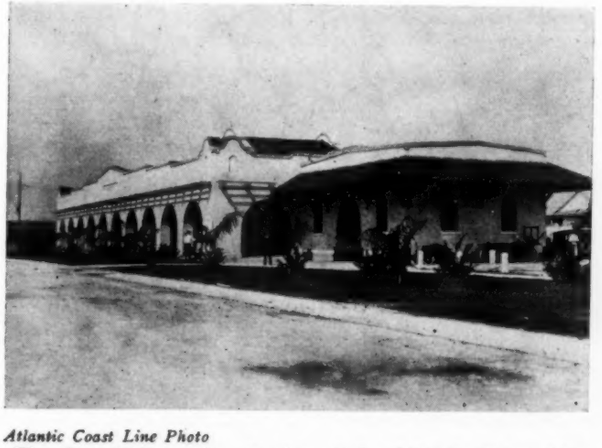
The control of the substation can in most cases be conveniently located in the adjacent interlocking tower where there is available throughout the 24 hours of the day a signalman for performing the control operation. This signalman can be communicated with by telephone service normally installed in the tower for the control of train movements. Our experience has indicated that it is desirable, where possible, to have a direct control point for the normal operation of the substation. Where this is impracticable due to there not being adjacent to the substation a signal tower or some other convenient location for control, we have made use, to a limited extent, of some form of supervisory control.

Special Heavy Truss Bridge With Inset Transmission Masts

Most discussions of railroad electrification have dealt with some phase of design or with the general history and the economies of electrification. I have attempted to present a picture of procedure and the practice in the actual construction, and of the methods of solving the many problems which arise in connection with the general engineering of the project.

It should, of course, be understood that the selection of the necessary electric locomotives and cars presents a separate and distinct problem; and, while this problem must be handled in such a way as to provide suitable equipment in sufficient quantity to handle the traffic at or about the time the construction work on the railroad is completed, it is a subject of such magnitude that I have not attempted to describe our method of handling it in this paper.

* * *



Atlantic Coast Line Photo

The Fort Myers, Fla., Station of the Atlantic Coast Line

New Haven Completes Its Come-Back

Earnings of $11.72 on common and dividend rate of 6 per cent put it in strong position to face other problems

THE year 1929 was notable in the history of the New Haven. The company had a net income of $22,296,268—an increase of $5,408,359 over 1928 and equivalent, after dividends on preferred stock and other deductions, to $11.72 per share on the common stock of the company. The dividend rate on the common stock was twice increased during the year—from a $4 per annum basis to $5 and, later, to $6. A large proportion of the increase in net income (79 per cent of it to be exact) was not due to the increased profitability of operations of the year, but to special income—$2,401,000 of back mail pay and $1,869,000 in settlement of disputed divisions.

All this additional income was expended for improved facilities. Excluding this abnormal revenue, gross operating revenues of the system totaled $138,188,670, an increase of $555,617 over 1928 and accounted for largely as follows: An increase in freight revenue of $703,626, in mail revenue of $196,011, and in dining car revenue of $61,597, and a decrease in passenger revenue of $428,618.

The New Haven an Unusual Railroad

It is helpful in understanding the operating performance of the New Haven to realize fully its extraordinary characteristics. Some notion of these may be gained by comparing operating averages for the New Haven with the average for the country. There is, of course, no such thing as an "average railroad," and every system in the country will show important deviations from the average for the United States. It is doubtful, however, whether there are many railways which show so many and so great variations from the average.

For example, the New Haven has a ratio (1928 figures) of multiple tracks to route mileage almost 200 per cent greater than the average for the country—and this in spite of the fact that one-third of its route mileage is classified as branch lines. Its passenger-miles per mile of road exceed the average by 584 per cent, while its net ton-miles per mile of road are 3 per cent below the average. The company derives 34 per cent of its operating revenues from passenger traffic, as compared with less than 15 per cent from this source for the railroads as a whole. The road's passenger service operating ratio in 1928 was 67.9, as compared with a freight service ratio of 68.8 and a passenger service operating ratio for the railroads as a whole of 91.7.

Merchandise and miscellaneous freight, which in 1928 made up but 25.6 per cent of the tonnage of the railroads as a whole, were 41.7 per cent of the total tonnage of the New Haven. L.c.l. was but 2.7 per cent of the total freight tonnage of all railroads, but it made up 8 per cent of that of the New Haven. The New Haven's payroll per mile of line is more than twice as great as that of the average for the country. The New Haven's revenues per passenger train mile in 1928 averaged $4.54, as compared with the country's average of $2.13.

Great Improvement in Operating Efficiency in 1929

These comparisons reflect the New Haven's peculiar position—serving the most densely populated area in the country, with many branch lines, centers of population

The New York, New Haven & Hartford

close together, and with a preponderance of passenger traffic and high grade freight. In spite of these peculiarities, however, the road gives a freight service quite comparable to that which might be expected on a road with less branch line mileage and a longer through haul. Salient statistics of freight service performance are given in Table I. It will be noted that train speed is quite comparable to that for the country as a whole. The average car load and the net tons per train average about 20 per cent less than these figures for the railways as a whole, which fact is easily accounted for by the heavy proportion of merchandise and l.c.l. traffic. In Table I

Table I—Comparison of Selected Freight Operating Statistics

	1929	1928	Per cent of change Inc.	Dec.
Mileage operated	2,103	2,121		0.9
Gross ton-miles (thousands)	10,454,695	10,272,480	1.8	
Net ton-miles (thousands)	4,179,705	4,129,492	1.2	
Freight train-miles (thousands)	6,042	6,443		6.2
Freight locomotive-miles (thousands)	7,350	7,610		3.4
Freight car-miles (thousands)	291,630	288,209	1.2	
Freight train-hours	470,706	496,346		5.2
Car-miles per day	25.0	23.2	7.8	
Net tons per loaded car	21.2	21.4		0.9
Per cent loaded to total car-miles	67.5	67.1	0.6	
Net ton-miles per car-day	359	332	8.1	
Freight cars per train	49.3	45.7	7.9	
Gross tons per train	1,730	1,594	8.5	
Net tons per train	692	641	7.9	
Train speed, miles per train-hour	12.8	13.0		1.5
Gross ton-miles per train-hour	22,211	20,696	7.3	
Net ton-miles per train-hour	8,880	8,320	6.7	
Lb. coal per 1,000 gross ton-miles	111	114		2.6
Loco.-miles per loco.-day	58.0	56.1	3.4	
Per cent freight locos. unserviceable	18.9	15.5	21.9	
Per cent freight cars unserviceable	9.4	9.0	4.5	

a great improvement in the efficiency of the company's freight service is to be noted, comparing 1929 with 1928. The total volume of traffic increased slightly, but freight train-miles declined 6.2 per cent and train-hours 5.2 per cent. Net ton-miles per car-day increased 8 per cent and comparable increases occurred in the number of cars per train, tons per train and net ton-miles per train-hour.

Maintenance of way expenses in 1929 totaled $20,017,176, an increase of $699,580 over the preceding year. Maintenance of equipment expenses totaled $23,382,073, a decline of $488,225. Transportation expenses, $43,310,452, were $568,346 less than in 1928. Ratios of these three classes of operating expenses to operating revenues were, respectively, as follows: Maintenance of way, 14.1 per cent; maintenance of equipment, 16.4; transportation, 30.4. The operating ratio was 66.07.

Gross income for the year, $38,937,551, was 2.3 times fixed charges. Deducting the extraordinary income of $3,686,000 (i.e., $4,270,000 less taxes), gross income still was more than twice fixed charges. The company's balance sheet discloses a proportion of stock to long term debt of 80 per cent.

The New Haven owns securities of or controls a considerable number of other transportation companies. Among them are several which, by reason of guaranties of interest by the New Haven, have been in the nature of liabilities. The New York, Westchester & Boston—a high-speed electric line in the New York suburban area—has been one of these. However, this line has been extended and its traffic is growing so that, in 1929, it was able itself to pay $511,000 of its interest, leaving the New Haven to meet $352,919 from its profit and loss. Another New Haven investment which has not been remunerative, i.e., that in the common stock of the Boston & Maine, has now been placed on a dividend basis and will yield an addition of $876,000 per annum to New Haven income.

Brighter Outlook for Unprofitable Subsidiaries

Other important companies in which the New Haven is interested, with their operating performance in 1929, follow: New York, Ontario & Western, net deficit, $250,045; New York Connecting R. R., net income, $30,520; New England Steamship Company, net deficit, $65,684; Hartford & New York Transportation Co., net deficit, $184,450; the Connecticut Company, net income, $1,030,340; Berkshire Street Railway Company, net deficit, $205,777; the Vermont Company, net deficit, $46,808; New York, Westchester & Boston, net deficit, $1,970,935; Soundview Transportation Company, net deficit, $8,036; New York & Stamford Railway, net deficit, $7,403; County Transportation Company, net income, $16,349; Springfield Street Railway, net income, $209,046; Worcester Consolidated Street Railway, net income, $184,050; New England Transportation Company, net deficit, $66,142.

In connection with these ancillary companies, attention may be directed to the fact that conditions with some of the companies which show deficits are improving. The important water lines, for example, made a better showing in 1929 than in the preceding year. The New England Transportation Company's deficit does not reflect the profitable nature of that company's operation as far as the railroad is concerned, saving it the expense of running unremunerative trains. The motor truck service offered by the transportation company in connection with the steamship lines should bring increased revenues to each. The continued improvement in the operations of the New York, Westchester & Boston has already been noted.

Passenger Traffic Vital to the New Haven

Figures given in the above have disclosed the fundamental importance to the New Haven of its passenger traffic. Many railroads may suffer severe losses in such business and scarcely feel the effects of the loss. This would not be true of a railroad such as the New Haven, with a third of its gross revenues derived from passenger

Table II—New York, New Haven & Hartford, Operating Results, Selected Items, 1916 to 1929

Year	Average mileage	Revenue ton-miles (thousands)	Revenue passenger-miles (thousands)	Revenue per ton-mile, cents	Total operating revenues	Total operating expenses	Net operating revenues	Operating ratio	Net railway operating income	Net after charges	Net charges for additions and betterments
1916	1,995	2,567,831	1,650,475	1.515	$80,432,167	$54,372,029	$26,060,138	67.60	.....	$5,554,977	$6,026,742
1917	1,995	2,776,144	1,814,461	1.460	85,784,893	61,970,060	23,814,833	72.24	.....	2,404,095	8,161,109
1918	1,992	2,938,402	1,831,116	1.729	102,294,212	87,846,253	14,447,959	85.78	$7,350,350	885,692	17,007,592
1919	1,966	3,169,099	2,023,988	1.557	106,545,120	92,835,701	13,709,418	87.13	6,055,126	—877,060	4,197,559
1920	1,972	2,919,685	2,153,959	1.943	123,512,310	126,346,384	—2,834,073	102.29	—12,575,137	—4,621,507	11,699,316
1921	1,986	2,493,064	1,891,343	2.159	116,405,233	106,402,295	19,002,938	91.41	740,034	—14,121,623	3,608,572
1922	2,003	2,608,412	1,850,961	2.309	123,246,641	99,988,856	23,257,785	81.13	12,074,160	—4,865,768	2,287,126
1923	2,001	3,050,944	1,909,398	2.212	133,940,586	107,816,094	26,124,492	80.50	13,277,728	—2,917,106	4,725,991
1924	1,986	2,976,323	1,826,282	2.141	127,213,698	97,480,324	29,733,375	76.63	19,787,279	2,998,650	4,008,915
1925	1,935	3,119,103	1,806,456	2.180	132,266,422	97,745,382	34,521,040	73.90	23,324,795	7,418,252	*1,874,915
1926	1,917	3,358,674	1,796,293	2.071	135,065,836	99,540,261	35,525,575	73.70	23,204,053	8,243,112	4,060,465
1927	2,175	3,851,911	1,758,677	1.958	139,824,315	100,278,252	39,546,063	71.72	25,235,284	10,432,661	11,426,237
1928	2,149	3,886,042	1,669,727	1.950	137,633,053	94,148,641	43,484,412	68.41	29,238,404	16,887,909	7,976,851
1929	2,132	3,912,925	1,662,346	1.955	142,458,670	94,118,545	48,340,126	66.07	33,631,144	22,296,268	†2,290,916

* 1925 expenditures totaled $8,805,921, from which were deducted retirements totaling $6,931,006, including $3,440,756 for retirements of freight and passenger train cars.

† 1929 expenditures totaled $11,790,946, but retirements amounted to $9,500,031.

service, and particularly since it has been able to derive from this service such a favorable ratio of net income to gross. On the other hand, the New Haven has been fortunate enough to hold its passenger revenues to comparatively slight declines, when compared with the general experience throughout the country. Passenger earnings in 1929, 46.8 million dollars, were but 11 per cent less than those of the post-war boom year, 1920. They were only 7 per cent lower than in the best year since federal control, 1923.

Passenger train service earnings have declined even less—in 1929 they were but 10 per cent lower than in 1920 and 7 per cent lower than in 1923. Furthermore, from a standpoint of net income it seems clear that passenger service is probably more profitable today, even with lower gross revenues, than it was at the peak. The operating ratio for this class of service was relatively high right after the war (82.9 in 1921). It was steadily reduced, however, to 67.9 in 1928. The company has been able to hold down its passenger train-mileage in a manner to maintain a high average earning per train-mile. In 1921 such earnings were $3.97 and in 1929 they were appreciably higher, $4.36. In all probability, the utilization of the motor coach services of the New England Transportation Company as a substitute for unremunerative train service has been a material factor in maintaining relatively high earnings per passenger train-mile, thus contributing to the profitability of the service.

That the management of the company is keenly alive to the importance of maintaining its passenger revenues is shown by its vigorous pioneering in the field of highway transportation in close co-ordination with its railway service. It is further extending its efforts to attract passenger business by an important and comprehensive program of improved service, the latest example of which is its de luxe train, the "Yankee Clipper," placed in service between New York and Boston on the fastest schedule ever offered for train service between these points.

Altogether, from a standpoint of the efficiency of its service, its adequacy to the needs of patrons and its profitability to the railroad, the New Haven may be said definitely to have completed its "come-back." There remain to the railroad, of course, many problems the solution of which would still further improve the position of the company—such as, for instance, some of its unremunerative subsidiaries and, possibly, the securing of something like the degree of co-ordination of rail and motor truck service as has already been attained in the case of rail and motor coach service. But problems of this kind, somehow, can usually be met more easily by a company on a sound dividend-paying basis than by one harassed by an uneasy credit situation. The New Haven, therefore, is now better prepared to face them than at any time in years.

THE PENNSYLVANIA, which moves to or from Washington, daily, about 109 trains, carried to that city, during the year 1929, in addition to the ordinary travel to and from the capitol, over 250,000 people traveling in tours, excursions and special parties.

TRAINS OF THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, now equipped with radio, include the Pioneer Limited, between Chicago and Minneapolis, the Olympian, between Chicago and Seattle, the Arrow, between Chicago and Omaha, the Southwest Limited, between Chicago and Kansas City, the Bat, between Chicago and Minneapolis, the Sioux, between Chicago and Rapid City and trains 3 and 20, between Sioux City and Manilla.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended March 8 amounted to 873,548 cars, a decrease of 73,991 cars as compared with the corresponding week of last year and of 78,008 cars as compared with 1928. Livestock was the only commodity classification to show an increase as compared with last year, while coal loading showed a reduction of 24,442 cars and miscellaneous loading a reduction of 26,706 cars. All districts showed reductions as compared with both years. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, March 8, 1930

Districts	1930	1929	1928
Eastern	200,760	221,872	218,680
Allegheny	178,524	191,754	187,128
Pocahontas	47,055	55,210	53,649
Southern	140,388	148,382	161,384
Northwestern	106,331	112,545	119,020
Central Western	127,347	136,169	136,620
Southwestern	73,143	81,607	75,075
Total Western Districts	306,821	330,321	330,715
Total All Roads	873,548	947,539	951,556
Commodities			
Grain and Grain Products	40,974	41,907	49,544
Live Stock	23,542	23,420	28,077
Coal	144,895	169,337	174,750
Coke	10,107	13,021	11,353
Forest Products	58,011	64,903	67,519
Ore	8,127	10,732	8,921
Merchandise L.C.L.	250,338	259,959	257,916
Miscellaneous	337,554	364,260	353,474
March 8	873,548	947,539	951,556
March 1	899,189	978,201	959,494
February 22	828,890	905,503	869,417
February 15	891,597	957,498	888,586
February 8	886,581	955,981	906,477
Cumulative totals, 10 weeks	8,628,123	9,263,331	8,950,687

The freight car surplus for the last week in February averaged 440,275 cars, including 206,531 box cars, 180,089 coal cars, 25,776 stock cars and 13,600 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended March 8 totaled 61,125 cars, an increase over the previous week and a decrease of 3,957 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
March 8, 1930	61,125	37,970
March 1, 1930	59,840	38,205
February 22, 1930	57,440	38,431
March 9, 1929	65,082	47,300
Cumulative Totals for Canada		
March 8, 1930	561,940	367,188
March 9, 1929	611,005	422,142
March 10, 1928	626,565	388,411

* * *

On the Virginian

Canadian National Plans Extensive Improvements at Montreal

To spend $50,000,000 for passenger facilities and grade separation—Air rights to be developed

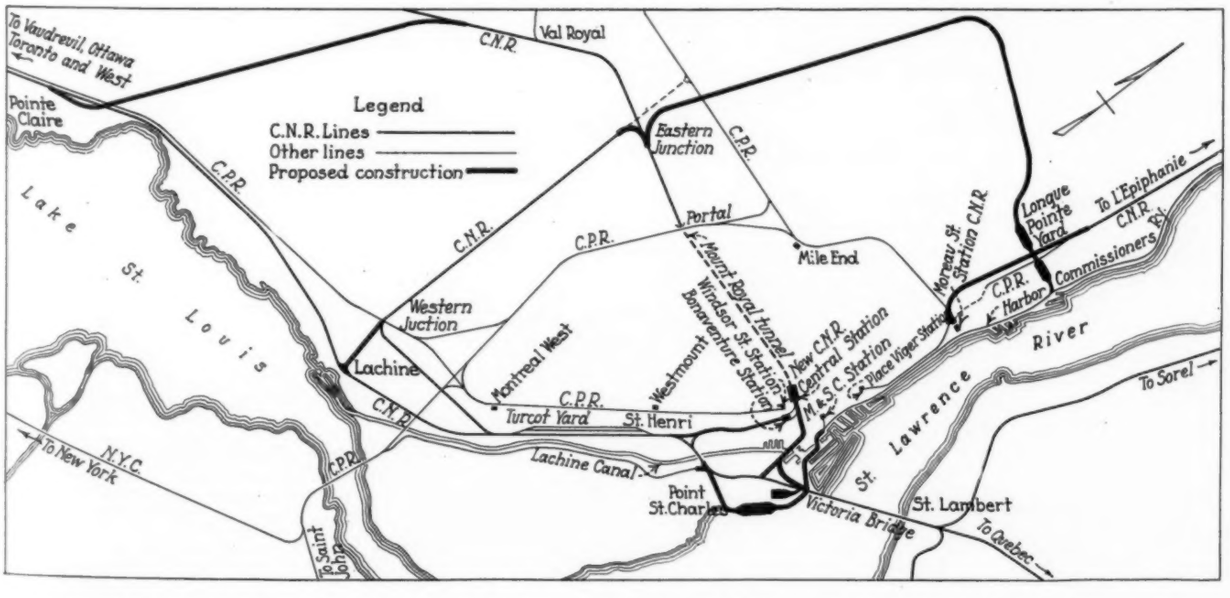
UPON the completion of plans now under way, Montreal, Quebec, will have the largest and most up-to-date passenger station in Canada, and one which will rival any similar facility in the United States. The new station is a feature of the Canadian National Railway's extensive terminal improvement project, which, in addition, includes a large office building directly over the station, with baggage, mail and express facilities beneath the station; the extensive development of air-rights over the station tracks and the adjoining railroad property; the construction of a considerable mileage of new connecting lines, some of which will be elevated; the abandonment and elimination of numerous grade crossings through track elevation or depression; the electrification of the terminal lines; the construction of a new coach yard; and numerous improvements in the local freight handling facilities. Altogether, the improvements in and about Montreal will cost in the neighborhood of $50,000,000, and it is expected that they will be completed in about five years.

Present Conditions are Unsatisfactory

The completion of these plans will remedy many of its adverse operating conditions in and about Montreal and will result in an outstanding civic improvement. Since the formation of this government-operated road, the Canadian National's facilities at Montreal have been the widely scattered and inadequate facilities of its constituent roads. For example, it has three passenger stations within the city: The Bonaventure station of the old Grand Trunk railway, located in the southern section of the city and serving trains of that road and the old Inter-Colonial Railway, principally from the southeast and west; the Tunnel station of the Canadian Northern, which is centrally located in the city near the south portal of the double-track tunnel under Mount Royal, and which serves trains moving to and from the north and west over the lines of the former Canadian Northern; and the old Moreau Street station of the same road, in the eastern part of the city, serving its lines north and east to Quebec City, the northern and eastern portions of the Province of Quebec including the Rouyn Mining field and the Lake St. John district.

For all practical purposes, these three stations are entirely independent and disconnected; the same condition applies largely to the freight facilities of the road. The most serious condition in this regard exists between the extensive freight facilities in the east and west sections of Montreal. These facilities are now so widely separated that transfers may be effected only by using the already overcrowded tracks of the Harbor Commissioners along the south waterfront of the city, or by a haul over the company's own lines from Longue Point, about two miles east of the Moreau Street passenger station, to the Turcot yards in the west side of Montreal, via Joliette, Rinfret and Eastern Junction to the north, a distance of 108 miles.

In addition to the operating disadvantages occasioned



General Plan Showing the Relationship of the New Passenger Facilities and New Lines in the Montreal Improvement Program

by these scattered passenger and freight facilities the Canadian National has been at a serious disadvantage in the condition of its three passenger stations, all of which are antiquated and inadequate. The most striking example of this is the Bonaventure station, which handles by far the largest part of the road's passenger business at Montreal. This station, an old fashioned red brick structure, was built in 1887. Entry to it involves numerous street crossings at grade, which have been a constant hazard to the public and a serious obstacle to efficient train operation. Some of these crossings have been an issue in Montreal for nearly 40 years, the first action in this matter following within a few years after the completion of the Bonaventure station.

Another serious disadvantage in the Canadian National's present situation in Montreal is that, owing to its limited facilities, its official and clerical staffs are housed in 14 different buildings. Many of these are public buildings, and for the most part, they are widely separated, a situation which has proved inconvenient, inefficient and uneconomical.

Ideal Site Available For Station

The present comprehensive plan of the Canadian National for the improvement, expansion and unification of its Montreal terminal facilities will remedy these adverse operation conditions and will provide for considerable expansion to meet future requirements. Detailed engineering and structural plans of the proposed improvements are incomplete at the present time, but the general plan of improvements is very definite in scope. The major item is the new passenger station, which is to be located on the site of the old Tunnel station. This site is considerably nearer to the central business district of the city than the present Bonaventure station, and is conveniently situated with respect to the hotel, department store, and theatre districts. Furthermore, it is surrounded by highly improved property, and itself includes an area of about 600,000 sq. ft., owned by the railroad, the air rights of which will be available under lease for the construction of hotels, theatres, stores and office buildings.

From engineering and operating standpoints, the tunnel site is well adapted for the station. It is immediately at the south end of the double-track tunnel under Mount Royal, and almost in a direct line between the tunnel and the Victoria bridge over the St. Lawrence, over which all trains enter the city from the south. The general topography of the area forming the new station site is also well adapted for the purpose. In the first place, the tracks at the south end of the tunnel are from 30 to 50 ft. below the general level of the surrounding property, which will permit extensive overhead development. Still more significant, the elevation of the tracks at the tunnel site is almost exactly the same as that of the tracks at the north end of Victoria bridge, and a level line between these points lies from 18 to 28 ft. above the intervening streets.

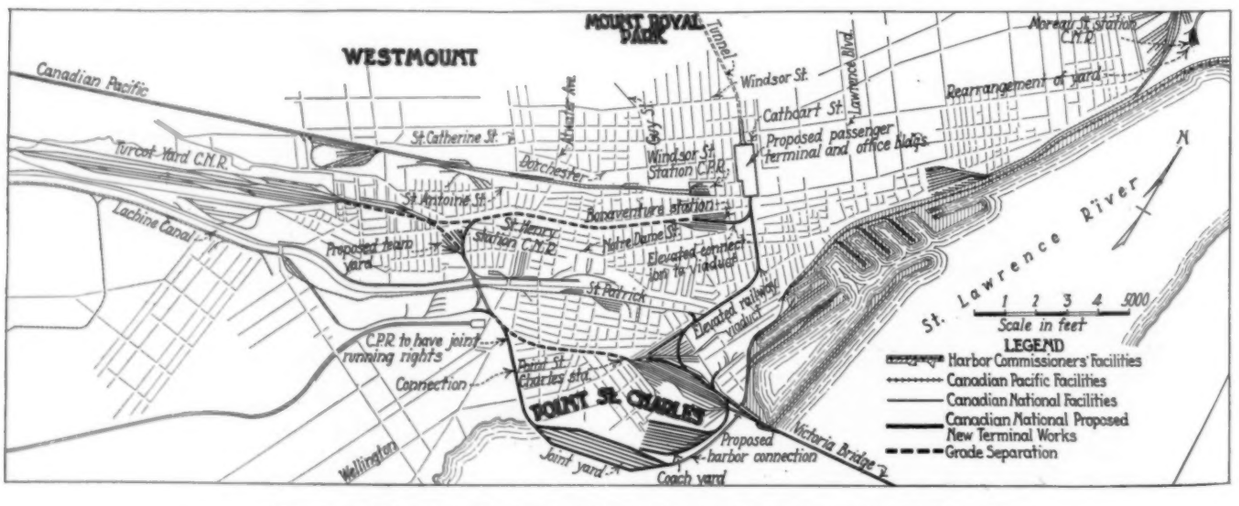
Station Will Be Under Ground

The station building itself will be located within an area bounded on the north by Cathcart street, on the south by St. Antoine street, on the east by St. Genevieve street, and on the west by Mansfield street. The station facilities will be almost entirely under ground, thus leaving the surface area available for air-rights development.

The tracks will lie in a generally north and south direction, crossing St. Antoine street overhead, and will extend on a level grade through the station site to the Mount Royal tunnel. All train operation into the station will be electrified, it being the plan to electrify the terminal tracks as far north as Eastern Junction for the electric operation of all trains to and from the north and west, and to electrify the terminal tracks to the south, across Victoria bridge to St. Lambert, for the electric operation of trains to and from the south and east.

All of the tracks at the station will be under ground and will be served by car floor level intermediate platforms. All baggage, mail and express facilities will be located beneath the track level with elevator and ramp connections to the track platforms. A vehicle approach to these facilities will be provided at street grade from St. Antoine street.

The passenger facilities will be located above the track level and will be connected with the track platforms by means of stairs and ramps. The main train concourse is planned at right angles to the tracks, directly under Dorchester street, and along its south side will be located a spacious waiting room with all of the auxiliary facilities necessary to a modern, well-equipped station. New streets will be provided, running through the station site, over the tracks, and existing streets surrounding the station area will be widened and im-



Map of Montreal Showing the Proposed Facilities and Necessary Connecting Routes

proved where necessary to preclude traffic congestion.

Special features contemplated in this latter regard include a double-lane vehicle subway under McGill College avenue, parallel with the tracks, extending from the north side of the station, north to a point a short distance beyond St. Catherine street, one of the main business streets of the city. This subway and the proposed new streets through the station area will, in addition to providing a convenient access to the station, be of great benefit to the city in improving street traffic conditions and will further eliminate traffic congestion and delays at both St. Catherine and Dorchester streets, which are two of the main east and west thoroughfares.

Another special feature to facilitate the movement of traffic to and from the station will be an underground taxicab stand and garage. Passenger entrances and exits to the station, both for those arriving on foot and in private automobiles, will be ample in number and conveniently located from the four streets immediately surrounding the station.

Directly above the passenger station facilities, a large office building is planned which will house all of the executive and operating offices of the Canadian National at Montreal. All of the other area directly over and immediately adjoining the terminal area, except that to be occupied by streets, will be available for the construction of hotels, theatres, stores and other office buildings on long term leases.

South Approach to be Over a Viaduct

One of the most advantageous features of the new station site is that it can be made available to all trains of the Canadian National entering Montreal, with greatly improved operating conditions, with a reasonable expenditure. Immediately upon the opening of the station it will accommodate 95 per cent of the Canadian National passenger trains entering or leaving the city, and shortly thereafter, with the final completion of all of its approaches, it will be able to handle the remaining 5 per cent with allowances for expansion in traffic on all of its lines.

The approach to the station from the south will be over a viaduct and fill extending from the station at St. Antoine street, to Victoria bridge, in as direct a line as possible on property already in the possession of the road. As mentioned previously, the existing situation with regard to the elevation of the tunnel and bridge tracks is most favorable to such a line, which will be level throughout and from 18 to 28 ft. above every street crossed, thus providing sufficient headroom without street grade alterations. From the station south to Wellington street, a distance of seven blocks, there will be a six-track viaduct of reinforced concrete construction, with steel bridge spans over all streets crossed. The viaduct and bridges, which will be made architecturally pleasing in character, will have waterproof decks, and the tracks will be carried on stone ballast. All of the area beneath the viaduct will be available for storage space, garage or other uses, and, as the Canadian National owns certain property along both sides of the structure, there will be a favorable opportunity for the construction of buildings adjoining the viaduct, in communication, when desired, with the undertrack storage space.

South of Wellington street, to the Canadian National's yards at Point St. Charles, the new line will be carried on a structural steel viaduct, and from the latter point to Victoria bridge, it will be carried on an earth embankment. The new line will be two miles shorter than the present line from the bridge to Bonaventure station, via St. Henri, and will not only improve operation from this standpoint, but will also be a most important element in the elimination of the 20 or more street grade crossings on the present route.

The new station and its viaduct approach will permit the extensive development of the present area at Bonaventure for freight purposes. A portion of this area is already a well-established center of the fruit and vegetable trade in the city, and the removal of the passenger facilities will allow the road to greatly expand and improve its service in the handling of perishable produce.

Immediately upon the completion of the new station facilities, about 80 per cent of the passenger traffic on the present line via St. Henri will be put over the new line. This will greatly simplify and reduce the cost of eliminating the grade crossings on the present route, as fewer tracks will have to be raised to carry the remaining traffic. If the new passenger route from Victoria bridge to the new central station was not to be provided, it would be necessary in order to provide comparable facilities, to elevate six tracks from Bonaventure to St. Henri, instead of only two as now contemplated, and to elevate four tracks from St. Henri to the bridge, instead of only two as now planned. It is felt that the saving in this respect will, to a large extent, offset the expense of the proposed new viaduct line to the new station, not to mention the substantial saving in operation which will accrue in the handling of so many trains over the new and shorter route.

In addition to the advantages mentioned, the new route will make it easily possible to move passenger trains between the new station and the eastern part of the city and beyond by means of a viaduct connection with the Harbor Commissioner's tracks along the St. Lawrence river waterfront, when the development of the Commissioner's track facilities permit of such movement.

New Connecting Lines to be Constructed

The existing tunnel under Mount Royal will constitute the northerly and westerly approach to the new station, and it is expected that the two tracks of this route will be capable of carrying from three to four times the volume of traffic which will be impressed upon them immediately after the new facilities are put in use. However, in order to take full advantage of this line and to connect it with the facilities in the east and west sections of Montreal, two important cut-off or link lines are planned.

One of these is to be a single-track line for the present from Longue Pointe, in the eastern part of the city, which will extend to the north and then swing to the west around the back of Mount Royal, to a connection with the tunnel line at Eastern Junction. This line will be about ten miles long, and immediately upon its completion, east end passenger trains will be able to operate into and out of the new station, via the tunnel. Of greater importance, the new link line will provide a much needed connection between the various yards and tracks located in the eastern part of the city and those located around Turcot in the western part of the city.

At present, the shortest route over Canadian National tracks between Longue Pointe and Turcot is via Joliette and Rinfret Junction, a distance of 108.4 miles. The new route around the mountain, to be made possible by the link, will reduce this distance to 20.4 miles. There is a shorter physical connection between Longue

Pointe and Turcot via the Harbor Commissioner's tracks on the river front, but during the navigation season, prompt and satisfactory movement of cars is almost impossible because of the great volume of traffic on these tracks.

In addition to its advantages as a passenger train connection to the new station, and as a connecting line between now widely separated freight facilities, it is expected that the new line will stimulate extensive residential and industrial development in the area traversed, which is not now provided with railway facilities. Economic studies in connection with the line indicate that the savings in operation via the line will more than pay the additional fixed charges resulting from its construction, and that with the increased traffic expected, substantial profits will be made.

Western Trains to Reach Station Also

The second of the two new sections of line to be built will be a double-track line joining the tunnel line, which itself serves the Laurentian Mountain district and Ottawa, and connects with the present main lines to Toronto, Ont., and the northwest. This new line, which will be about six miles in length, will leave the tunnel line about nine miles from the new station and will swing to the west, connecting with the main line near Pointe Claire. When completed, all passenger trains to and from the west now entering and leaving Bonaventure station, via St. Henri, will operate into the new station via the new line and the tunnel through Mount Royal.

This new line, like many of the other new facilities planned, is principally an advantageous substitute for additions or betterments otherwise necessary in connection with existing facilities. This line will eliminate the necessity for the construction of additional tracks on the present route from Pointe Claire to St. Henri and Bonaventure, now urgently needed to carry the present heavy freight and passenger traffic.

The new line will be constructed without highway or street grade crossings, and in addition, the only two highway grade crossings on the tunnel line within nine miles of the new station will be eliminated. The expenditure for the new line is estimated to equal only that necessary otherwise to provide the additional facilities required on the present line, so that it appears to be more than justified.

New Coach and Freight Facilities Planned

In addition to the improvements already mentioned, a number of other improvements are contemplated, some of which, however, are not connected with the new passenger facilities in any way. The more important of these auxiliary improvements include a new coach yard at Point St. Charles, a new joint yard with the Canadian Pacific at Point St. Charles for the handling of freight to and from the harbor, and a new enginehouse and coach yard on the tunnel line near Eastern Junction.

The new coach yard at Point St. Charles will replace the present inadequate facilities between Turcot and St. Henri, and will be located immediately alongside the Canadian National's large shop facilities, with close connection to the proposed viaduct line to the new station. The new yard site will permit of extensive expansion of facilities when necessary, and its close association with the shop facilities and the station is expected to result in substantial operating economies.

The new freight yard at Point St. Charles, to handle harbor traffic, will lie to the south and west of the new coach yard and will replace the present small and totally inadequate yard which has only a single track connection with the harbor tracks. The Canadian Pacific has no entrance to the west end of the harbor, and therefore, in the interest of export trade and port development generally, the new yard will be constructed jointly with that road, and the Canadian Pacific will be granted certain running rights over the tracks of the Canadian National in order to reach the yard. Concurrent with this improvement, the Harbor Commissioners will construct a new double-track line along the river front, from their existing trackage near McGill street to the east end of the new yard, to and from which they will then handle all harbor traffic.

The new enginehouse and coach facilities planned near Eastern Junction on the tunnel line will serve trains to the north and west using the new station, and will replace similar facilities now located at Turcot. Here again is a case of substituting one expenditure for another, as the present engine and train facilities at Turcot are now overtaxed and would otherwise have to be enlarged at approximately the same cost as the proposed new facilities. Still other improvements planned in the Montreal work include the reconstruction of certain engine facilities already at St. Lambert, with the addition of such new facilities as may be made necessary by the plan to make it the terminus of electric operation to the south.

All of the plans for the extensive terminal improvements of the Canadian National at Montreal have been prepared and are being carried forward under the general direction of C. B. Brown, chief engineer of operation.

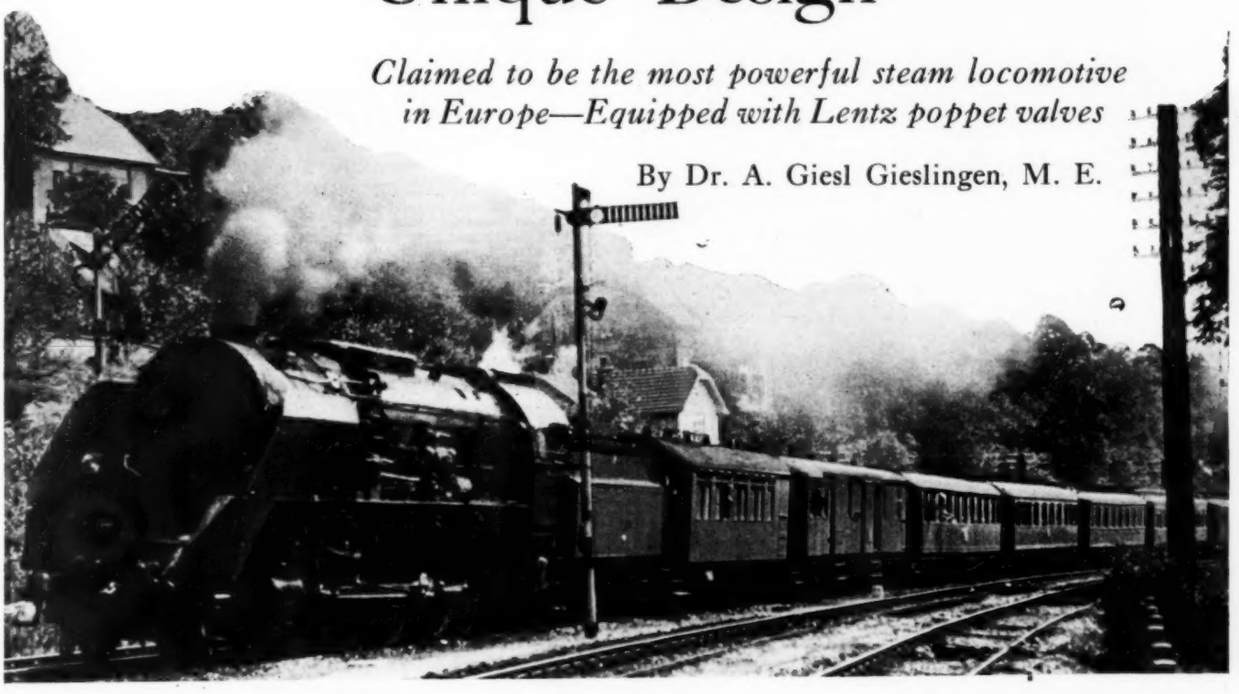
* * *

On the New York, New Haven & Hartford, Near New London, Conn.

Austrian 2-8-4 Locomotive of Unique Design

Claimed to be the most powerful steam locomotive in Europe—Equipped with Lentz poppet valves

By Dr. A. Giesl Gieslingen, M. E.



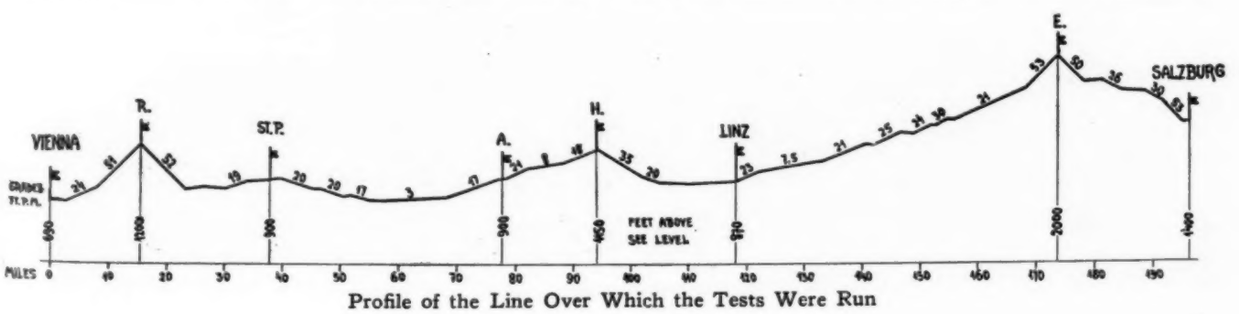
Test Train on the Austrian Western Railroad

CONNECTING Vienna with Germany, Switzerland and western Italy, the Austrian Western Railroad forms the backbone of transportation in that country. It extends from Vienna via Salzburg and Innsbruck to the Swiss frontier, a total distance of 465 miles. Electrification of the mountain territory beyond Salzburg, traversing two mountain ranges 3,200 and 4,200 ft. high, is nearly completed according to the extensive program established after the World War. With 12 per cent of electrified mileage, Austria ranks second in the world. During the last eight years, however, coal prices dropped radically and through the additional effect of more economical operation, the fuel bill in relation to total expenses fell from the exorbitant figure of nearly 30 per cent in 1921, to 8 per cent in 1927, and has still a downward trend. With a price of coal at the enginehouse of $4.70 per ton of 12,000 B.t.u., present relations are similar to those on American roads.

Electrification of the Vienna-Salzburg division, 196 miles long, was abandoned under these circumstances, and the purchase of modern steam power decided on.

Referring to the condensed profile of the Vienna-Salzburg line, many curves of from 4 to 5 deg. enforce speed reductions even in the easiest sections. It will be seen that locomotives of unusual characteristics are required to handle 750-ton trains over the entire division at an average of 48 m.p.h., westbound, with three intermediate stops. The axle load is limited to 40,000 lb. With few exceptions, the rails weigh 88 lb. per yd., while replacements are being made with 98-lb. rails of 82-ft. length, which will carry an axle load of 55,000 lb.

One of the illustrations shows a side elevation of a two-cylinder simple locomotive, which was built as a result of extensive studies by the Wiener Lokomotivfabriks A. G., Floridsdorf, Austria, in November, 1928. The guarantees offered by the builders included the hauling of a 700-ton train at an average of 51 m.p.h. with a speed limit of 69 m.p.h. Present regulations keep the maximum at 62.6 m.p.h. It is significant for



Profile of the Line Over Which the Tests Were Run

Front View of a Three-Cylinder Locomotive Equipped with Wind Guides Similar in Design to Those on the New 2-8-4 Type

the difficult character of the line, that this 10 per cent difference in permissible speeds affects the running time only to 1½ per cent westbound and 2½ per cent eastbound, as only short sections are fit for such speeds. Guarantees were based upon a continuous performance of from 2,400 to 2,500 cylinder hp. between 50 and 69 m.p.h., corresponding to 1,950 and 1,650 hp. at the drawbar. While the indicated output could be easily exceeded by from 12 to 15 per cent with constant water level in the boiler, the drawbar horsepower proved to be 18 per cent more, ranging between 2,300 and 2,400 hp. at speeds of 50 and 45 m.p.h., respectively. This was due to the unexpectedly low running resistance of this locomotive. In fact, the mechanical efficiency, including air resistance and tender, figured from 86 to 91 per cent under the above conditions.

Important Features of the Design

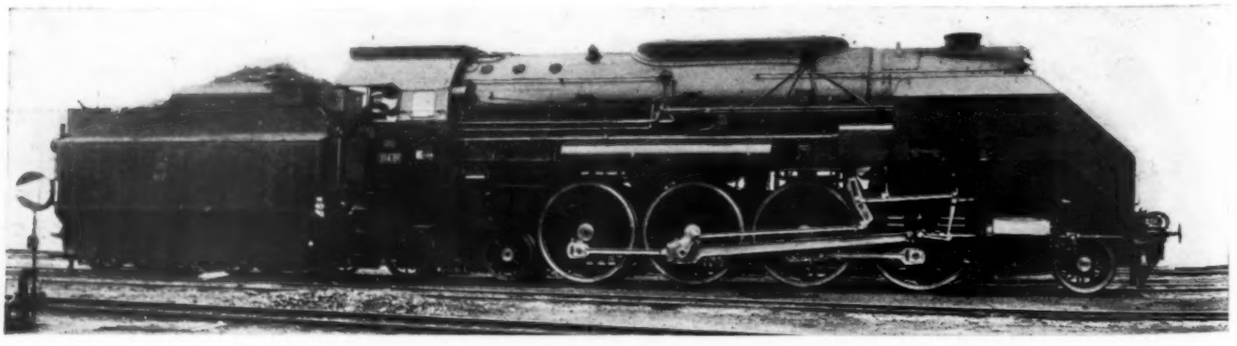
These requirements resulted in the construction of a locomotive having a rated maximum tractive force of 44,100 lb. The boiler operates at a pressure of 213 lb. and supplies steam to cylinders having a diameter of 25.6 in. and a stroke of 28.4 in. The diameter of the driving wheels is 76.4 in. The total weight of the engine is 260,200 lb. of which 155,800 lb. is carried on the drivers. The factor of adhesion is 3.54.

The high tractive force required for the ruling grade and also for acceleration was in no measure allowed to interfere with the running qualities at maximum speeds. The locomotive had to be suitable for 75 m.p.h., and 4½-deg. curves are often traversed at 60 m.p.h., notwithstanding operating regulations. It was necessary to reduce maintenance costs with the new design as compared with previous Austrian designs. In 1927, locomotive maintenance in Austria amounted to 140 per cent of the fuel bill, against 110 per cent in Germany and 100 per cent in the United States.

Principal Dimensions and Weights of the Austrian Western Railroad 2-8-4 Type Locomotive

Railroad	Austrian Western
Builder	Wiener Lokomotivfabriks—A. G.
Service	Passenger
Rated maximum tractive force (85 per cent)	44,100 lb.
Weight on drivers ÷ max. tractive force	3.54
Cylinders, diameter and stroke	25.6 by 28.4 in.
Valve gear, type	Walschaert—Lentz
Weights in working order:	
On drivers	155,800 lb.
On front truck	33,900 lb.
On trailing truck	70,500 lb.
Total engine	260,200 lb.
Total engine and tender	123,300 lb.
Wheel bases:	
Driving	20 ft. 4½ in.
Rigid	13 ft. 7 in.
Total engine	41 ft. 6 in.
Total engine and tender	64 ft. 4 in.
Wheels, diameter outside tires:	
Driving	76.4 in.
Truck	40.7 in.
Boiler:	
Type	Straight top
Fuel, kind	Soft coal
Diameter, first ring inside	77⅛ in.
Firebox, length and width	105 in. by 70 in.
Tubes, number and diameter	151—2¼ in.
Flues, number and diameter	30—5⅝ in.
Length over tube sheets	20 ft.
Grate area	50.8 sq. ft.
Heating surfaces:	
Firebox	203 sq. ft.
Tubes and flues	2,851 sq. ft.
Total evaporative	3,054 sq. ft.
Superheating	1,076 sq. ft.
Combined evaporative and superheat.	4,130 sq. ft.

These comparisons placed the Austrian Federal Railways in a bad light and the management was anxious to show improvement. Utmost simplicity in design was desired. The four-cylinder compound with the high-pressure portion between the frames, which formerly dominated in Austria, was out of the question. A conventional boiler pressure had to be used, as the railroad was badly in need of power and no time-consuming experiments could be conducted. High superheat and scientific design of the steam engine had to render the essential fuel economy; essential not only in itself, but still more on the ground of obtaining maximum horsepower out of the limited capacity of the fireman. The varying character of the line did not yet warrant the application of a stoker, as only certain sections of the



Two-Cylinder 2-8-4 Type Passenger Locomotive Built for the Austrian Western by Wiener Lokomotivfabriks A.G.

line require full power for not more than from 15 to 30 min. The engine, coupled to a standard tender, had to be turned on a 66-ft. turntable. These basic requirements led to the following solutions:

Wheel-Arrangement

The inverted Pacific, or 2-6-4, type had been created in Austria for high speed service with 84-in. drivers in 1909. The excellent results secured with 99 locomotives of this type led to the adoption of the 2-8-4 arrangement as a natural development. This locomotive has the running qualities of a 4-6-4 type with 33 per cent increase in tractive force and is only slightly longer. Lateral motion devices on the engine truck and lead drivers permit the negotiation of 12 deg. curves.

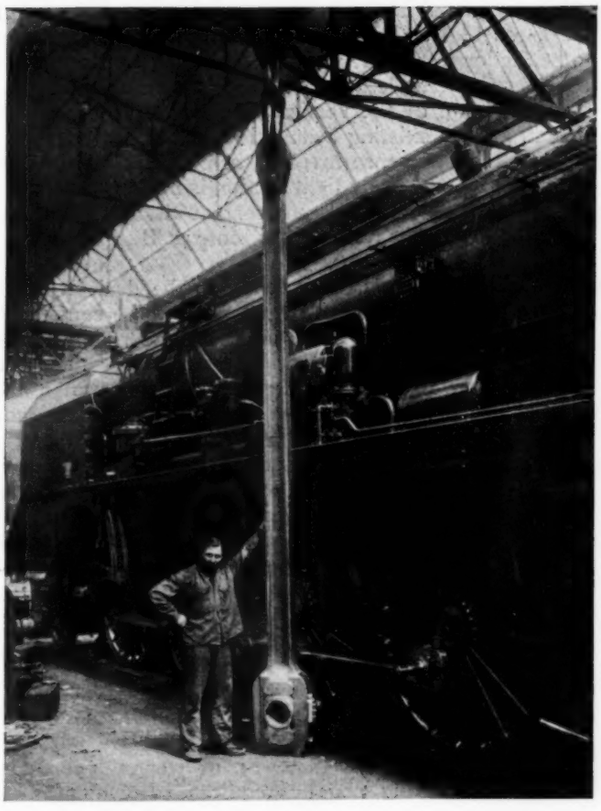
The arrangement provides guiding qualities superior to a 4-8-2 type locomotive with its wide-swinging trailer and its generally insufficient load on the engine truck. Considering that the side thrust to be exerted by the leading wheels for the negotiation of curves ranges from 4 to 8 per cent of the engine weight, it is obvious that a truck, carrying only from 15 to 20 per cent of the locomotive weight as generally found, must necessarily leave an unpleasant percentage of this side thrust to the first pair of drivers, resulting in high rail stresses. Here, the guiding weight, as the load on the spring-controlled front wheels may be termed, is 28 per cent of the total. The centering springs can therefore be made strong enough to relieve the fixed driving wheels from excessive flange pressure. The initial tension is 6,600 lb. and rises to 15,000 lb. with maximum side play. The intention of the designers to adjust these springs so that the stops limiting the side play will never come into action, has been fully met. The locomotive is guided along the track by a smooth, predetermined spring tension and hard shocks are avoided. At especially high speeds three front and from two to three rear flanges touch the outer rail which distributes and minimizes the rail stresses.

The pleasing appearance of the locomotive is apparent in the several illustrations shown. It is the simplest and most compact design possible with four pairs of 76.4-in. drivers. The adhesive weight is 60 per cent of the total, but can be raised to 65 per cent, if the permissible axle load is increased. These are good figures for a specific high speed design and is another feature of the 2-8-4 wheel arrangement. It should also be remarked that the deep firebox has vertical walls and a vertical throat sheet. The 2-8-4 type of freight locomotive, introduced in America a few years ago by the Lima Locomotive Works is certainly worthy of further development for high speed service along the lines as indicated above.

The Frame

Weak frames were the main reason for high locomotive maintenance in Austria. The low axle load of 32,000 lbs. maintained in all previous engines and the demand for high output induced designers to use exceptionally light frames which, while admirable for the boldness of their conception, deformed and led to excessive wear of the whole driving gear, as well as additional running resistance.

To Americans, who enjoy the strength and adaptability of the Commonwealth one-piece steel bed casting, the solution here employed need be only briefly mentioned. Such large steel castings being unavailable, an absolutely rigid built-up construction was substituted. The two plate frames are connected by a two-piece casting of 85,000 lbs. tensile strength, which extends from the front bumper to the rear coupled axle. Additional



The Main Rod Applied to the Austrian Western 2-8-4 Type Is 13 ft. 11 in. Long Between Pin Centers

castings form the connection at the rear. This frame greatly exceeds any existing European design in strength, and contributes essentially to the success of this locomotive.

The Steam Engine

The builders apparently involved a risk by the adoption of the two-cylinder arrangement. In fact, the railroad contemplated a three-cylinder engine even in its original plan for a lighter 2-6-4 type. Experiences with 40 2-8-0 type passenger locomotives, Series 113, which were hitherto the heaviest Austrian two-cylinder engines, with 80,000 lb. piston thrust did not encourage the use of still heavier working parts for even higher speeds. While the locomotive works of Wiener Neustadt advocated and secured an order for a three-cylinder single-expansion engine, the Floridsdorf Works relied on the possibility of meeting all difficulties by suitable design and undertook the jump to 107,400 lbs. piston thrust, or 35 per cent more than so far experienced, thereby approaching American loads, yet with only two-thirds of the axle load.

The world may never come to an agreement as to extended or non-extended piston rods. Certainly the extension is expensive nonsense unless made sufficiently stiff to carry the piston properly which, oddly enough, is often neglected. If a liberal and easily accessible rod bearing is provided it should be apparent at a glance whether the wear of this bearing is still within the limits. An outside bearing has been employed in this design which follows the elastic deformation of the rod by moving around a horizontal axis. The piston rod is 3.86 in. in diameter throughout, hollow bored to a thickness of only 0.35 in. for the extension and 0.85 in. between the piston and crosshead.

The main rod is shown in one of the illustrations. It measures 13 ft. 11 in. between centers, and is believed to be the longest in the world. This extreme length was considered desirable in order to reduce rail stresses under the action of the vertical component of the piston thrust. Many existing locomotives are defective in this respect. The expense involved in manufacturing these long rods of extremely light section is nothing compared with the damage done by incorrect designs. In this engine, the main rod weighs only 850 lbs. without brasses.

Unavoidable irregularities have to be dealt with by special measures. An important point to be considered in the design was the back end of these rods. It appears that an unequal bearing pressure over the axial length of the pin is the main cause of hot cranks and excessive wear. Therefore, the brass bearing was made free to adjust itself around a vertical axis, so that the connection between the pin and the rod is similar in many respects to a universal joint. Perfect bearing contact is secured over the entire 7.1-in. by 8.7-in. pin. After 13,000 miles of express-passenger service, the wear of the babbit bearing was less than 1/200 in. on the diameter. Oil lubrication has always kept it cool. In striking contrast to this extraordinary result are the records of the previously mentioned 2-8-0 type locomotives, the keys of which had to be driven in after every 1,000 miles of service.

Similar contrasts have been achieved in the life of the side-rod bearings which, when properly adjusted, run 20,000 miles with 1/200 in. of wear. The main-connection bearing usually requires adjustment after half this distance. The play allowed between the axle boxes and pedestals was 1/120 in. The front and rear coupling pins are spherical and so are the crosshead pins. The back end of the main rod can be taken from the crank pin and swung sideways for inspection without touching the crosshead end. The handling of spherical bearings, however, requires some experience which the Austrian Federal Railways have been acquiring for the past 20 years.

Lentz Poppet Valves

Credit must be given to the Austrian Federal Railways for its vision in developing the poppet valve gear for locomotives. It was real pioneer work. Although locomotives were equipped with poppet valves in Germany about 17 years ago, or nine years before the first Austrian installation, many difficulties had to be overcome. The Lentz gear is the result of a long development in which the Floridsdorf Locomotive Works took a leading part. Ruggedness and simplicity appear to be the main differences when compared with other or earlier designs, and these are fundamental requirements in railroad service. The small cams which acted on rollers and levers, and which have always been associated with the poppet valve gear, have been eliminated. A conventional, but light Walschaert gear moves a swinging cam shaft. A cam, 4 in. in width turns directly on the flat surface of an intermediate lever. By a happy design of these two parts a relative rolling movement practically without sliding is secured between the cam and the lever during the acceleration period of the valve, when considerable force is required. Sliding occurs largely during retardation under small contact pressure. Wear is negligible and is limited to the brass cam which can be easily replaced. The gear requires no attention for 100,000 locomotive miles and more. This, from the viewpoint of the railroad, is the principal objective and means not only a direct saving as compared with other means of steam distribution, but secures a better average condition of the valve gear and considerable steam economy.

When drifting, the inlet valves are automatically lifted from their seats and connect the cylinder front and back of the piston through ample areas. Thus, sucking in of cinders is avoided and there is no compression when running light. With only 60 tons behind the tender, the engine drifted down a curved grade, shown on the profile drawing, of 35 ft. to the mile at 50 m.p.h. between mileposts 94 and 100.

The Austrian Railways have now over 400 locomotives with poppet valves, five of which are of the Caprotti type. They have definitely abandoned the piston valve. Inlet and exhaust opening in this engine occurs twice as rapidly as in the German standard Pacific type with 12-in. piston valves. The sound of the exhaust is sharply defined. At 70 m.p.h. the quick release makes the exhaust sound like that of an internal combustion motor.

Special Equipment

Accessories are standard and need not especially be referred to. It might be mentioned that a Sunbeam turbo generator is installed. The lubricating system has been carefully designed, 42 bearing points being served by mechanical pumps, including all axle boxes, truck bolsters, etc. No grease is used on the working parts. The feedwater heater is of the Dabeg open type with a mechanically driven pump. The smokebox has a downward extension to secure a low position for the exhaust nozzle and a sufficiently wide stack. With a plain nozzle of 6.3 in. diameter the draft is somewhat too strong. Wind guides have been applied at the front of the locomotives, creating a current of air along the boiler which prevents the exhaust from trailing down into the cab.

Service Results

The railroad made extensive tests on the upward run from Vienna to Linz, 118 miles, early in the summer of 1929, after the locomotive had been in regular service for several months. No repairs were made or work performed to place the locomotive in first-class condition. The valves and piston rings remained untouched. The coal consumption was nearly constant with trains from 400 to 740 tons, averaging 3.06 lbs. of coal of 11,700 B.t.u., or 2.96 lbs. of dry coal per drawbar horsepower-hour, including all auxiliaries and losses from terminal to terminal (or 2.66 lbs. of dry coal of 13,000 B.t.u.). The average speed was 48 m.p.h. and the maximum 66 m.p.h. One stop and about five speed reductions were made, one of these being a reduction to 20 m.p.h. on a one-per-cent grade, where track repairs were being made during the entire test period.

The thermal efficiency averaged 7.01 per cent including all losses. The combustion rate was from 50 to 80 lbs. per sq. ft. of grate, as an average, with a maximum of 120 lbs. for periods not exceeding 15 min. These results cut by three per cent the guarantees for fuel consumption given by the builders for this service. Judging from this performance, one drawbar horsepower-hour in sustained service will be delivered for 2.2 lbs. of dry coal of 13,000 B.t.u., excluding auxiliaries, at 40 m.p.h. and the maximum service rating of 2,100 drawbar horsepower will correspond to a combustion rate of about 100 lbs. At 60 m.p.h. the consumption rate will rise to 2.3 lbs. The cut-offs required are 38 per cent and 30 per cent respectively.

The valve gear permits of service cut-offs as short at 2½ in., or nine per cent of the stroke, and even less,

whereby the compression reaches two-thirds of the boiler pressure. These cut-offs are smaller than required and experience indicates that a minimum of from 15 to 20 per cent should be used with any kind of valve gear with regard to overall economy and a view of limiting friction and wear.

The records of this locomotive, which averages 9,000 miles a month in a comparatively short-haul service, are a clear indication that much can be achieved by careful design with entirely simple and, in principle, conventional means. The next step should be towards higher pressures.

Electrification Projects Discussed by Engineers

H. W. PINKERTON, assistant electrical engineer, Cleveland Union Terminal Company, and E. L. Moreland of Jackson & Moreland, consulting engineers, were the speakers at a meeting of the Transportation Group, American Institute of Electrical Engineers, in New York on Tuesday, March 18. Mr. Pinkerton presented a general illustrated description of all the electrical equipment used in the Cleveland Union Terminal development. This includes 17 miles of double-track electrification, together with all the necessary operating and maintenance equipment. It also includes a new station, tower building and various other buildings which have been made possible by overhead rights. Mr. Pinkerton's presentation was concluded with a motion picture showing locomotives in operation on a part of the line where they are now being used to train enginemen.

Mr. Moreland, in a short illustrated talk, gave a clear picture of the Lackawanna electrification plans, including explanations of the several unusual types of apparatus to be used, such as over-compound mercury-arc rectifiers and 3000-volt, direct-current multiple-unit cars.

Discussion

S. Withington, electrical engineer, New York, New Haven & Hartford, spoke of the prime importance of air rights in the Cleveland Terminal development. In commenting upon the three separate contracts entered into by the Lackawanna for power, he said that in his opinion it was the inalienable right of any railroad to purchase power at a given point and use it wherever it wished along its right-of-way. In comparing the Cleveland Terminal and the Lackawanna installations, he commented particularly on the sharp contrast which they present. Although both systems employ 3000-volt, direct current, one develops the power by motor-generator sets and uses it on locomotives, while the other employs rectifiers exclusively and uses the power for multiple-unit trains. It indicates, he said, the state of flux of the industry and continued this thought by saying that while it is probably too soon to expect any form of standardization, that nevertheless standardization must be attempted if serious difficulties of interchange are to be avoided. He expressed the thought that data soon to be available on the Cleveland Terminal, the Lackawanna, the Reading and the Pennsylvania electrification systems should provide information on the basis of which engineers might discuss standardization.

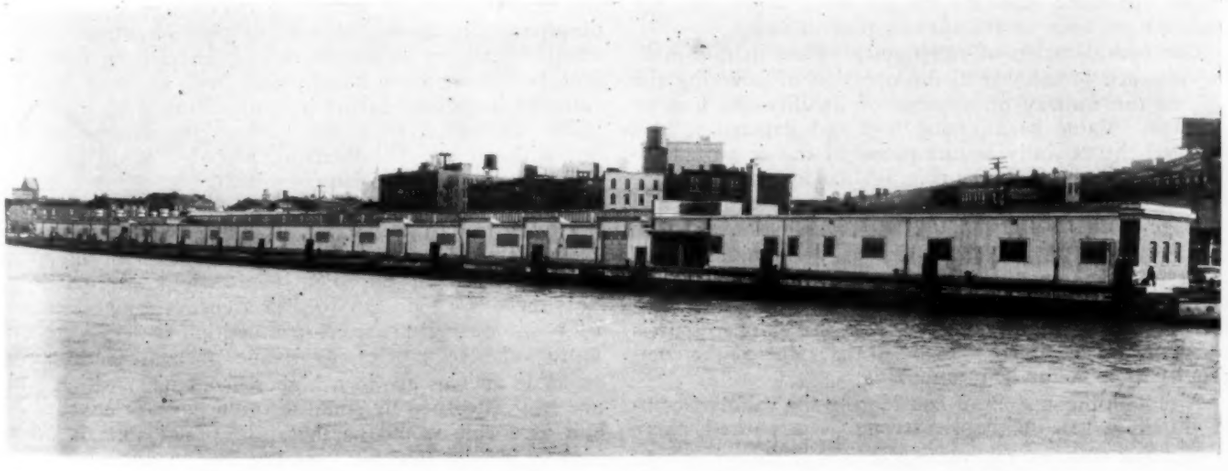
Norman Litchfield of Gibbs & Hill, consulting engineers, told how the Pennsylvania is to extend its 11,000-volt lines into its New York City Terminal and through the tunnels to the Sunnyside Yards on Long Island. With reference to the question of power contracts, he referred to the fact that the Pennsylvania carries its own transmission line so that it can use its power at any point on the line.

C. A. Butcher, Westinghouse Electric & Manufacturing Company, outlined some of the early history of electrification. American installations have lagged behind those in Europe because of the relatively low priced fuel in this country; the demand for electric traction in this country is now being increased by the need for greater capacity without increasing the number of tracks.

W. B. Potter, General Electric Company, also outlined the early history of electric traction in the United States and Europe and explained how many of the systems now in use were selected because the cost of that particular system was the lowest for the specific application in hand. Third rail, he said, was adopted by the New York Central Terminal electrification because of limited clearance, the increasing of which would have cost millions of dollars. He feels that the development of the rectifier bears much promise and expects to see overhead construction used for all future work but feels that the kind of power to be used is still in doubt.

Following the discussion, both Mr. Pinkerton and Mr. Moreland were required to answer many questions concerning details of the work which each is doing.

* * * *



The Delaware, Lackawanna & Western's Lake Freight Station at Buffalo, N. Y.

Commodity Values and Freight Rates*

An argument to indicate the proper method of approach to this complicated problem

By M. O. Lorenz

Director, Bureau of Statistics, Interstate Commerce Commission

IT is beyond dispute that in classifying freight or in fixing freight rates the market value of a commodity is a factor that is frequently considered, but no definite theory on the subject has been generally accepted. We read that the Western Classification Committee formerly had a rule for considering value wherein the number of dollars per hundred pounds was added to the number of cubic feet per hundred pounds and the sum referred to a scale for determining the class. This rule was given favorable comment by the Interstate Commerce Commission in 1912 but so far as known to the writer, the rule has not been mentioned in subsequent cases and apparently has fallen into disuse.

In the 1915 Western Rate Advance Case F. H. Millard suggested that value of commodities might be considered in rate-making by computing a rate by cost accounting methods but varying the rate of return on investment according to the value of the commodities, the articles of low value being called upon to pay a return of 4 per cent on investment and those of higher value a higher return, the per cent being increased by one for each additional $10 of value per ton, with the limit at 25 per cent for values of $205 or more.

More recently, Isaac Born, in the presentation of cases before the Interstate Commerce Commission has attempted to give definite expression to the value factor. In a case, for example, dealing with rates on strawboard he assumed that a difference of $5 per ton in the values of two commodities which are being compared should produce a difference of 1½ per cent in the rate. He also endeavored to compute what the relation should be on the basis of cost of transportation and then multiplied together the cost factor and the value factor to get a final relative rating. Reference may also be made to the variation in rates based on varying values of specified commodities, as for example increasing the rate on live-stock 2 per cent for each 50 per cent or fraction thereof in value.

The consideration of commodity values in rate-making is much broader than the question of covering the risk to the railway on account of liability for loss or damage. Value as affecting loss and damage is best handled theoretically as one phase of the cost of service, since the cost of insuring against loss and damage can be approximated from past records of loss and damage claims. In spite of an occasional expression to the contrary, the general tenor of the opinions of the Interstate Commerce Commission and the courts is very clearly to the effect that it is value as indicating variations in the value of the service to the shipper that is meant when reference is made to the value of the commodity as a factor in rate-making.

Although the custom of considering the value of commodities in rate-making is strongly entrenched, there are exceptions or limitations in actual practice. Where one kind of commodity has a wide range of value per one hundred pounds, as illustrated by the cheaper and finer grades of furniture, it is not considered practicable to vary the rates on the different grades according to the invoice value. The value of one article may in some cases be ignored if it is competitive with a cheaper article. Where value is considered in classifying an article or group of articles, it must necessarily be on the basis of some representative or average value. Complainants and defendants in a classification case frequently differ as to the range of prices, but it is usually possible to adopt some value as representative.

As a matter of theory, this difficulty need not concern us. Circumstances other than value may modify the consideration to be given to it. There is a tendency to give food products and seeds, for example, lower ratings than other articles of similar value and transportation characteristics. It is not the purpose here to review all of the considerations which influence the assignment of articles to particular rate classes. The discussion will be confined to the theory underlying the consideration of value and how it can be combined with the consideration of cost, which is also clearly recognized in rate proceedings as one of the most important factors in the making of freight rates.

When it is said that an article of higher value should, other things being the same, pay a higher freight rate than is charged against an article of lower value because of the difference in value of service, the assumption apparently is that the shipper of the more valuable article is able to pay more or that he should pay more because he is getting a greater benefit from having a greater amount of value change its location. The objection may be made that the value of the commodity can not accurately measure either the ability to pay or the benefit received, since the differences in the cost of production among the various producers may make small differences in freight rates important on valuable articles. A northern hosiery mill finds existing freight rates an important factor in competition with southern mills. Or again, an article of low cost of production, but with an inelastic demand, probably could stand a great increase in freight rates if all competing sources of supply received the same increase.

Ability to pay freight rates varies more directly with the margin of profit in a transaction than with the price of the article shipped. But if in various lines of business there is a tendency to seek a customary percentage of profit over expense, if competition is less keen on more valuable articles, or if the purchasers of more valuable articles are in a higher economic position and are less concerned by small differences in price, the result as a rule would be that it is practicable to get a higher freight rate per one hundred pounds as value

* Statement Issued by Interstate Commerce Commission.

per one hundred pounds increased. Whatever the cause may be, it is a fact that the judgment of practical men is to the effect that, generally speaking, a substantial difference in the market value of two articles means some difference in the freight rates that it is reasonable and practicable to charge.

This leads us to the question whether the exaction of higher freight rates on articles of higher value is to be considered proportionately, progressively, or regressively. Should the article worth 30 cents a pound pay just three times the rate charged against an article worth 10 cents a pound, or more than three times, or less than three times? In actual practice the answer has been very definite that the relation should be regressive, when the rate is taken as a whole. For example, cocoa beans, worth 10 cents a pound, take 5th class in the Western Classification, while sheet aluminum, worth 33 cents a pound, takes 3rd class, both in carloads with a minimum of 30,000 pounds. Third class rates are 75 per cent above fifth class. In other words, for an increase of over 200 per cent in the value there is a 75 per cent increase in the rate.

In a recent statistical statement (No. 29111), issued by the Interstate Commerce Commission, the average values per ton and the average freight revenues per ton were given for 156 groups of carload commodities. A study of the relation between these two sets of figures, after setting aside certain clearly abnormal cases, indicates that the tendency is to vary rates, not in proportion to values, but in proportion to amounts between the square root and the cube root of the values. But this result is not conclusive because the average freight revenues used were for varying lengths of haul, and also because the duplication in tons originated involved in re-shipments results in an understatement of some average freight rates.

Why should freight charges be on a regressive basis with respect to value? The explanation doubtless is that if cost and value are both considered and if a value factor is added to a cost factor, a declining relation of the total rate to value as value increases would result. Thus, let it be assumed article *A* is worth $20 per one hundred pounds, and article *B* $4 per one hundred pounds, but that they weigh the same per cubic foot and that for a given haul the minimum cost of carriage for each is taken to be 20 cents per one hundred pounds; and let it be further assumed that a value factor of 10 cents per one hundred pounds is added for *A* and 2 cents for *B* for this haul. The value factor by itself will then be in direct proportion to value while the total rates of 30 and 22 cents would not be so proportionate, the ratio of rate to value being 1.5 per cent for *A* and 5.5 per cent for *B*.

In the course of time a consciousness of what price per pound is appropriate to some of the classes without regard to cost appears to have grown up. Thus, in a recent case a partly dissenting opinion indicates that a first class carload rating for a commodity worth 35 cents a pound would be clearly too high. In another case a dissenting opinion says, "Except on very light commodities, where the weight density is the controlling consideration, the split between third and fourth class freight comes at about 40 cents a pound."

As a matter of theory, it would seem logical that, if the value of the commodity is to be considered in rate-making as indicating variation in value of service or ability to pay, the comparison should be between value and the total rate, not with some fraction of the rate. The ability of a Western fruit grower to pay freight charges in reaching the Eastern market involves the relation of the total freight charge in comparison with the market price, and the railroad's cost of carriage has nothing to do with how much the shipper can afford to pay. Ability to pay must mean ability to pay the freight charge, not the ability to pay something in addition to the computed cost of carriage. If two articles are each worth 25 cents a pound, but if one loads 15,000 pounds per car and another 60,000, the cost of transportation per one hundred pounds of the former is so much higher than that of the other that the addition of the same value factor to the cost of transportation in each case might make the total charge on the bulky article unreasonably high. Instead of the addition or multiplication of two separately computed factors like value and cost, a conceivable procedure is to use them as alternatives. The total rate on a cost basis and the total rate on a value basis could be separately computed and the larger of the two be chosen on the theory that each article should pay cost as a minimum but a higher rate if its value permits, the aggregate being limited by what the carrier needs. However, it will be found more practical in working out exact rates statistically to assume that the value of service factor is to be added to a cost factor in each case, but to exempt lightly loading articles in part from the value factor because their rates are high on a cost basis.

To get at the fundamentals of combining cost and value we may ignore classification problems, and assume that an appropriate rate is to be made for each individual article. The freight classification is primarily a convenient device for avoiding the making of rates on thousands of individual commodities. The place of any particular article in the classification, so far as cost and value are concerned, could readily be determined by comparing the computed rate with the class rate scales for an average distance. To pursue the matter along this line, it will be assumed that the reader is familiar with the distinction between constant and variable expenditures, and that the proper sphere for cost of service in rate-making is in distributing the variable cost, and that for value of service the proper sphere is in distributing the constant or overhead cost. The importance assigned to the value of service element will therefore depend on where one draws the line between those expenses which are variable with traffic growth and those which may be assumed to be unaffected by it. This has been discussed elsewhere[1]. For the purpose of the present article it is sufficient to say that the decidedly preponderant part of the total cost is to be regarded as variable and the minor part constant. This is to apply not only to the operating expenses, but also to the return on capital[2]. The preponderant or variable part of the total amount to be raised should be assessed against particular shipments on the basis of well known cost accounting methods[3]. The question before us now is, how shall the distribution of the minor or "constant"

[1] See Clark, J. M. Economics of Overhead Costs.

[2] That investment is greatly affected by traffic can readily be demonstrated from available data of the investment per mile of line for various railroads of varying traffic density. Taking all of the railways more than 300 miles in length (to minimize the effect of terminals on the per mile of line figures) and omitting four railways for which complete data were not at hand, a comparison of the gross ton-miles (freight and passenger services combined) per mile of line with the tentative or final valuations issued by the Interstate Commerce Commission, shows that the relation between traffic and value may be expressed by the equation:

Value per mile (at prewar prices)	equals $12,745 plus	the product of $11,906 and the number of gross ton-miles per mile per annum

It is obvious that the constant factor, $12,745, becomes relatively less important as the traffic grows.

[3] Opinions differ as to the degree of reliability with which the cost of transportation services can be computed, but that the computation can actually be made by apportioning expenses in various accounts on plausible bases is not open to question.

part on the basis of the value of the commodities be accomplished?

Value and Distance

At the outset we are confronted with the question of how value of service is related to distance. Obviously the cost to the railway is affected by distance, but does the value of service to the shipper or the ability to pay grow with distance? The purpose of transportation is to overcome distance, and apart from the cost, it might be urged more service is rendered in overcoming 200 miles than 100 miles. This may be true as to passenger traffic where the ride itself is enjoyed, but not as to freight traffic. If a manufacturer sells goods with a haul of 100 miles to 50 customers and then extends his sales to a second 50 customers 200 miles away, the profit from selling a unit of product f. o. b. to one of the second 50 is presumably the same as that of selling to one of the first 50. In fact, the greater time consumed in getting goods to the more distant points may be a disadvantage that has to be overcome by price cutting, so that the value of the service is less.

It seems clear that economic considerations do not require a grading of the value element according to distance. But neither do they prohibit such a grading if the progression for distance or tapering in the total rate is such as not to restrict traffic. Where separate rate scales are prescribed for important individual commodities, it is possible to vary the rate of progression for distance to suit the individual case, but in connection with class rate scales, which have fixed percentage relations to first class at every distance, it is necessary to have the same progression for all the articles in a given class regardless of whether they get into it primarily on account of their bulk or their value. There is also the legal consideration that the short haul shipper may charge discrimination if, through the addition of a constant value factor regardless of distance to a cost factor varying with distance, he is called upon to pay a larger percentage of profit over cost to the railroad than the long haul shipper pays. On practical grounds we seem driven to the conclusion that the value factor may best be handled by grading it in some convenient and non-discriminatory manner for distance.

Commodities of Varying Value

We have next to determine how the value factor is to be varied for commodities of varying value. In making this variation there seems no good reason for departing from a strictly proportionate basis, but a limit beyond which value is not considered seems advisable in order not to drive traffic to other forms of transportation, and, as above indicated, articles with a small load per car should not bear the full addition for value.

To give definiteness to the discussion, it will be of service to show the precise method of procedure in combining cost of service and value of service for a hypothetical railroad.

Let it be assumed that a railroad must raise $3,333,333 from its freight service which has the following traffic composition:

Kind of freight	Tons carried	Load per car—tons	Number of carloads	Market value per ton	Total market value
A	400,000	40	10,000	$3	$1,200,000
B	300,000	30	10,000	60	18,000,000
C	150,000	20	7,500	200	30,000,000
D	108,000	12	9,000	300	32,400,000
E	24,000	12	2,000	20	480,000
F	18,000	6	3,000	800	14,400,000
Total	1,000,000		41,500		96,480,000

For simplicity we shall assume that each class of traffic has the same average haul, 300 miles. Of the total sum to be raised, 10 per cent or $333,333 will be distributed on a value basis and 90 per cent or $3,000,000 on a cost basis. The cost will be taken as divisible, 30 per cent for terminal and 70 per cent for line haul service. The terminal cost will be distributed for simplicity in this illustration on a per car basis and the line haul cost on a gross ton-mile basis. The tare weight of a car may be assumed to be 20 tons. The $333,333 to be distributed on a value basis will be divided between terminal and line service in the aggregate in accordance with the expenses. The terminal part will be apportioned to commodities according to the number of dollars of market value and the line part according to the number of dollar-miles, except that the articles with a load of less than 15 tons per car will be assessed on only one-half of their value.

The foregoing assumptions lead to the following figures:

Commodity class	Terminal cost per ton	Line cost per ton mile (cents)	Total cost for 300 miles	Value tax per dollar (terminal) (cents)	Value tax per dollar per mile (line) (cents)	Total value tax per ton (300 miles)	Total rate per ton (300 miles)	Per cent Value element of total rate	Total rate of market value
A	$0.5422	0.574	$2.26	0.1373	0.0010678	$0.014	$2.27	0.6	75.8
B	0.7229	.637	2.63	.1373	.0010678	0.274	2.90	9.4	4.8
C	1.0844	.765	3.38	.1373	.0010678	0.915	4.29	21.3	2.1
D	1.8072	1.020	4.87	.0687	.0005339	0.686	5.55	12.4	1.8
E	1.8072	1.020	4.87	.0687	.0005339	.046	4.92	0.9	24.6
F	3.6145	1.658	8.59	.0687	.0005339	1.830	10.42	17.6	1.3

It will be noted that although only 10 per cent of the total freight revenue is collected on a value basis on this hypothetical railroad the value element in the rate varies from 0.6 to 21.3 per cent. For commodity classes *A* and *E*, the value tax is negligible. The per cent which the total rate is of the market value varies from 1.3 to 75.8. In this connection it may be noted that if we assume that operating expenses and taxes absorb 80 per cent of the revenues and that the other 20 per cent yields 6 per cent on investment, then the collection of 10 per cent of the total revenues on a value commodity basis is equivalent to saying that the operating expenses, taxes, and one-half of the investment return should be collected on a cost basis and the remainder of the return on a value basis.

Nothwithstanding the fact that in the hypothetical illustration the value element is proportionate to the value of the various commodities, except for the concession to the lightly loading commodities, the total rate becomes relatively less important as value increases. Although these averages and percentages rest on a hypothetical case, they correspond to a considerable extent with conditions as we find them. Freight rates are today on a predominately cost of service basis, but the minor value factor is woven through the whole fabric, and to eliminate it would bring many radical changes in rates. The result of the preceding analysis is to show that the proper method of approach in "considering" cost and value of service is to compute rates on a statistical basis with a separate sphere for cost and value, rather than to seek for some relation between total rate and value on some regressive percentage basis. It need hardly be added that there are many other conditions besides cost and value which may affect the rate to be prescribed in a particular case.

TWO HUNDRED AND FIFTY CARLOADS A DAY has been the movement this season of lettuce by the Southern Pacific from the Imperial Valley, Southern California; and the total of the shipments up to March 1, was 9,528 carloads, an increase of 1,039 cars over the same period ot the preceding season. It is said that 86 per cent of this crop goes to Eastern markets, New York, Philadelphia, Chicago, Kansas City and 140 other cities.

"Reciprocity" Hearings Resumed in Washington

AFTER a two-weeks' suspension of the "reciprocity" investigations which the Federal Trade Commission has been making in connection with a complaint filed against Swift & Company and others for unfairly using traffic to influence railway purchases, the commission resumed its hearings at Washington, D. C., on March 18 and 19 and at New York on March 20 and 21. At Washington the hearing centered around the Atlantic Coast Line and the Chesapeake & Ohio, and it appeared that Swift & Co. had hit a snag in dealing with the former. Testimony showed that Swift & Co is a large shipper over the Atlantic Coast Line and used selling methods similar to those employed on other roads examined in previous hearings, but that these methods were used with little or no success, the Atlantic Coast Line refusing to subscribe to the "reciprocity" principle of Swift & Company and be diverted from buying its supplies strictly on their merit.

G. B. Elliott, president of the Atlantic Coast Line, testified that he had had no personal contact with the officers of the Mechanical Manufacturing Company or with Swift & Company with reference to the purchase of draft gear or other devices but identified correspondence received in 1928 by S. H. Dare, general western freight agent of the Atlantic Coast Line, in which R. O'Hara, traffic manager of Swift & Company solicited draft gear purchases on a "reciprocity" basis.

When asked if the Atlantic Coast Line has any fixed policy relating to the purchase of railway equipment and the subject of "reciprocity," he said that the purchasing of that road was universally done on a merit basis subject to the mechanical department's approval and gave as his reason for such a policy the considerations of service and economical operation. "We purchase," he added, "only what is fit for service." He said this has been the policy of the Atlantic Coast Line as long as he has been with the company.

When asked further if the quantity of the traffic a bidder on railway equipment devices gives the road has any bearing on awarding purchases Mr. Elliott reiterated that the policy of the Atlantic Coast Line is to make purchases on the basis of merit, adding that "we have not been swayed by the possibility of obtaining traffic." He presented statistics showing that Swift & Company ship large quantities of livestock, packing house products and phosphate rock over the Atlantic Coast Line. Though this business, in his opinion, was highly competitive, the Atlantic Coast Line handled an increased tonnage of these commodities over 1928 in most cases.

Mr. Elliott was subsequently asked why the Atlantic Coast Line had not purchased draft gear from the Mechanical Manufacturing Company and stated that generally it was because the price seemed to be higher than gear already being purchased and also that the mechanical department had not recommended it.

C. McD. Davis, vice-president in charge of traffic, testified that the correspondence of Mr. O'Hara with Mr. Dare had been received by him and that following this letter and a long distance call from W. A. Mayfield, assistant traffic manager of Swift & Company, he had written the superintendent of motive power explaining the interest of Swift & Company in soliciting draft gear purchases and suggesting that a representative of the mechanical department visit the Chicago plant of the Mechanical Manufacturing Company to investigate the gear, but stating at the same time that he had "no thought that we should be influenced by traffic." He submitted a letter Mr. Dare had written to him on May 3, 1929, referring to draft gear purchases in which Mr. Dare said: "In handling this matter I have indicated very clearly to both Mr. O'Hara and Mr. Mayfield that any decision in reference to the use of this or other mechanical devices would, in my opinion, be governed by the decision of our mechanical department; in other words, I have not in any way intimated that I could in any way assist them with a view of securing additional traffic. However, I am confident that Mr. O'Hara had this in mind in so far as any additional allotment of phosphate is concerned."

He subsequently testified giving Mr. Dare to understand that purchase "of draft gear rests with the mechanical department and that the weight of the traffic will have no influence on our road but that the device must be considered strictly on its merits." He did not recall that any draft gears were purchased.

F. H. Fechtig, purchasing agent, testified that he had no direct negotiations with Swift & Company or the Mechanical Manufacturing Company about the draft gear but that subsequent to the death of the general superintendent of motive power he responded to a request of the general manager to review the correspondence and make a report on the subject. He testified that there had been no solicitations on the purchasing department for the draft gear and when asked why no draft gears had been purchased he said because he had received no orders for them. From the correspondence in the mechanical department he knew that Swift & Company wanted the Atlantic Coast Line to buy the draft gear on a reciprocity basis but he testified that "this is so entirely contrary to the principle of the Atlantic Coast Line that it cut no ice whatever with me," and he added: "When I came to the Atlantic Coast Line 36 years ago as purchasing agent I was directed never to buy any freight or to handle anything in any way except on the merits of the case."

R. J. Turnbull, assistant to general superintendent of motive power, had not participated in the investigation of the draft gear and the Mechanical Manufacturing Company himself but knew that a representative of the mechanical department had visited Chicago for the purpose and reported to Mr. Hawkins before the latter's death. He testified further that it has been the general policy in the mechanical department of the Atlantic Coast Line for many years, according to instructions from Mr. Hawkins, that with reference to "any new device brought to our attention we should investigate first to see if it was a patented device and in any dealings to see that the railroad will not become involved in patent suits, after which the device is investigated with reference to its practicability, and finally with reference to its price," and explained that these were all the steps in a typical investigation.

O. A. Wallace, superintendent of car repairs of the Atlantic Coast Line, testified that he went to Chicago in July, 1929, in response to the request of R. D. Hawkins, general superintendent of motive power, for the purpose of inspecting the draft gear of the Mechanical Manufacturing Company and that he first saw W. A. Mayfield, assistant traffic manager of Swift & Co., who told him that 250 gear had been applied up to that time on Swift cars but that no test had been made of the gear

in the laboratory of Purdue University where the American Railway Association tests were being conducted. Mr. Mayfield said he did not have much faith in such tests. He then inspected the gear and gear assembling at the plant and found roughness in some of the friction parts and some cracks in certain castings which he believed would cause the gear to stick in service and he so reported to Mr. Hawkins. He said that Mr. Mayfield told him that he was giving considerable business to the Atlantic Coast Line and hoped the road would buy some of the gear, but he explained to Mr. Mayfield that the policy of his road was to test new devices and get all the facts before making applications. He further testified that he found that it would cost about $15 per set more to buy the Durable gear than the road was paying for other gear.

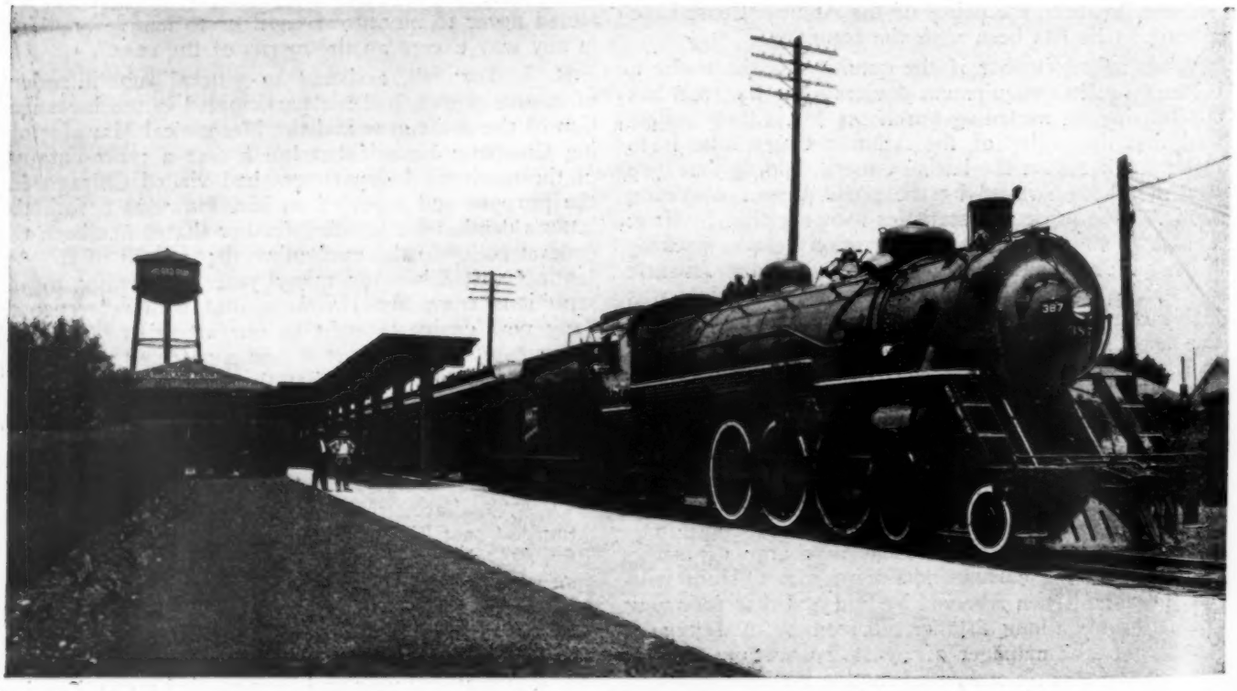
C. & O. Questioned

The examination of the Chesapeake & Ohio was confined to taking testimony from H. C. Pearce, director of purchases and stores, and J. W. Small, chief mechanical officer, in the absence of other witnesses. Mr. Pearce testified that he first heard of the Durable gear in 1929 when he received a copy of a letter written by W. J. Harahan, then president of the Chesapeake & Ohio, to Mr. Small, and was advised by Mr. Harahan to put the Mechanical Manufacturing Company on the list of bidders for draft gear. He said that the Chesapeake & Ohio bought 250 sets of the gear in 1929 out of a total of 3,177 sets of all gear bought during that year for new freight cars. He said the Durable gear was bought at a cost of $67.86 delivered, less an application credit of $2.10, or a net cost of $65.76, which was slightly higher than the prices paid for other gear. When asked how gear are bought on that road he said that the purchasing department "has no responsibility as to the type of gear which shall be purchased," and also said that the mechanical department looks over the tabulations of the bids on specialties like draft gear, and must approve the specialty before purchase.

J. W. Small, chief mechanical officer of the Chesapeake & Ohio, said that he was asked by Mr. Harahan to investigate the Durable gear with reference to the possibility of using it on new equipment, and that he obtained a report of the Erie's investigations which had been made prior to that time and then subjected one of the gear to a laboratory test. As a result of this investigation, which was made in January, 1929, he said he could not see his way clear to recommend the gear because of excessive wear, loss of capacity and sticking. He said that he talked to Mr. Harahan about it but that the latter felt that some of the gear should be applied and that 250 sets were ordered for a service test. The gear were not applied to the coal cars in the car program because he felt that, because of the heavy loading and long trains, such cars should only be equipped with a gear of the highest possible capacity. The Durable gear were applied instead to 40-ton box cars. Mr. Small said that he had not yet inspected the gear in service and upon questioning by the counsel for the respondents, stated that he had not yet received any reports of sticking or breaking. He also said under cross-examination that it was true that the Mechanical Manufacturing Company had only been making the gear a short while when he made the investigation and agreed that statements were subsequently made by the manufacturer that improvements had been made. After further cross-examination he was asked by the attorney for the commission if the sticking of gear or its tendency to stick under test would have a bearing on his recommendations. This question was answered in the affirmative, as was also the question by the attorney for the commission as to whether he was willing to let his earlier testimony about the Durable gear stand without revision.

The hearing was then adjourned to meet in New York on March 20 and 21, following which a further hearing will probably be held in Washington to hear testimony from witnesses not available on Tuesday and Wednesday.

* * * *



M.-K.-T. Passenger Train No. 1 at Highland Park, Texas

Selling Railway Transportation in Great Britain*

Advertising methods and media employed by British roads with specific reference to the work of the London & North Eastern advertising department

By C. G. Dandridge
Advertising Manager London & North Eastern

THE selling of transport is an exhaustive problem and one which must be treated in a specialized manner. There are, in fact, several fundamental differences in selling a railway ticket and selling a brand of cigarettes, or a recognized make of motor car.

In times gone by traveling by train was taken as the *sine qua non* of the ordinary routine of business or pleasure. The timetable in the early days of railways, was probably the solitary advertising medium and no great effort was made to bring the railway schedule to the notice of the man in the street.

To-day something like 50 per cent of the London & North Eastern passenger business consists of speculative travel at reduced fares, each item of which must be individually announced and well advertised if it is to be sufficiently patronized to prove a business proposition. Alternately, competitive methods of travel have arisen, cut or reduced rail fares have resulted, and cheap travel has, in fact, come right to the forefront of our passenger revenue. We have developed along somewhat similar lines to our big stores, the bargain sale items of which, in common with the railway cheap fares, demand good salesmanship supported by effective advertising. To carry the analogy further, our passenger business may be divided into two categories, the utility items for which there is a constant demand, and the luxury items which, although not essential to existence, yet if brought sufficiently to the notice of the purchaser become part of the average expenditure over and above the bare cost of living. Within the last few years the inducement to spend any surplus money not required for the absolute necessaries of life has increased so much that very little is left for railway travel. It is the age of the cheap motor car, motor cycle, motion picture, graphophone, radio, etc.

The four principal railways of Great Britain represent a capital of over £1,000,000,000, and in the course of a year sell tickets of most varied descriptions to 1,300,000,000 train and steamship passengers. They own 83 hotels, the largest group in the world, and in addition serve 7,500,000 meals in railway dining cars. These figures perhaps indicate what the selling of transport means and the enormous variations of the appeal.

My own company carries over one million passengers every day and 150,000,000 long tons of freight per annum. It is a matter of interesting speculation as to how many of these passengers may be made economically sensitive to advertising and, more important, how many millions who do not at present travel by the London & North Eastern can be induced to do so, moreover, how many use our line because of advertising.

Advertising Methods Employed

Dealing first with passenger traffic, probably the most common and familiar form of advertising announcement is the railway handbill. This came into being, no doubt, with the necessity for amendment and corrections to the standing railway timetable, and was one of the first forms of railway advertising. Excursion trains were in the early days usually run by outside agents on a speculative basis. Commission was allowed to cover the cost of advertising and the latter took the form of handbills printed and paid for out of the commission, supplemented in some instances by newspaper announcements. As time went on and the business grew, competition arose and the railway companies adopted the policy of dividing the business among several agents. Eventually, to avoid complication, the advertising was taken over by the railways, and standards were gradually introduced in the character and form of the advertising material. At the present time my own company spends approximately £56,000 in the production of printing of handbills annually, and here alone lies great scope for the introduction of typographical experiments, scientific layout, and "stunts" of various kinds. To-day special standard type faces are chosen, pictorial headings, with due economy, are introduced to vary the monotony of the announcements, and recently short stories by well known writers are printed on the back of L. N. E bills with a view to making this simple medium more an advertisement and less a mere dull utility announcement.

Close on the heels of the handbill came the poster and here again we are bound to confess that the early examples suggested a primitive kind of printing and complete indifference to effective layout. Later on considerations of display began to take share and in the case of certain railways, in which I may include the old North Eastern, the subject was advanced a stage further by the introduction of standard type and setting. The value of clear messages, the appeal of the type face itself and above all the judicious use of what is known as "white space" have gradually brought us to the present day standard.

A radical departure from the conventional railway announcement is the "Variety Program" which has been

* From a paper read January 10 at a meeting of the Incorporated Society of British Advertisers in London.

issued for some time in London each week to advertise our various excursions and other cheap facilities, and it has proved so successful that the idea is now being extended to other large centers.

The Pictorial Poster

We may perhaps now devote a little attention to the pictorial poster. The change which has taken place in the standard both of design and printing of the pictorial bill has perhaps been the most remarkable feature of railway advertising during the last ten years. The artistic representation by recognized artists of the beauty spots served by our railways has gradually become an accepted fact and memory is so short that we regarded almost with horror some of the early railway productions.

The pictorial poster is a direct form of railway advertising and the railways possess particular advantages in having their own poster spaces at every station throughout the whole of their system, and often on property elsewhere too. My own company has something like 72,000 spaces at the stations, such spaces usually being on the eye level and at short range vision. Our pictorial posters are, in fact, exhibited on the railway stations and in the office windows throughout Europe, the United States, Canada, Australia, New Zealand, India, China, Japan, etc. It is not an unusual sight to find an L. N. E. poster on the summit of the Pilatus in Switzerland, or at some small station bordering upon the Sahara Desert.

Larger sizes of pictorial posters are to be found in Times square, New York, depicting the "Flying Scotsman" passing York Minster, as well as in Chicago and Los Angeles.

The effect of pictorial illustration is always an intriguing study; the passenger uses daily a certain railway station or frequently passes a familiar spot; he is accustomed to the monotony; he is weary with the usual repetition of announcements. One day, however, while the mind is occupied with other ideas, he is suddenly confronted with a bright and arresting design which, owing to its originality and perhaps forcefulness, he cannot pass without examination. The design has conjured up in the mind an idea or suggestion maybe of happy days spent on holiday, or the fascination of a journey by rail, or a visit to the Continent. A mood has been suggested and the subconscious mind begins to work—the propaganda has had its effect. Pictorial posters to-day are not merely the reproduction of pleasant pictures for decorative purposes; they must be alive and convey a mood or an idea which is absorbed quickly as the poster falls into the line of sight. The next phase is to link up with the design a message which can also be absorbed easily and without effort, and which will register consciously or subconsciously in the mind of the most casual observer an idea which may afterwards bear fruit.

Our railway posters are, of course, not confined to depicting landscapes or seascapes; designs are employed to create interest in the railway business in all its many phases. For example, our steamship services call for a share of pictorial presentation; the attractions of our hotels from time to time take pictorial shape and even the freight train services have their fascination when presented by the imaginative mind of the poster designer. Propaganda posters of a specialized kind, such as the "Safety First" series, designed by Arthur Watts, also take their place in the gallery of L. N. E. posters. So far as my own company is concerned, practically the whole of the seaside and inland resorts served by the L. N. E. are parties to joint advertising schemes under which the local resort authorities leave the pictorial presentation to the railway advertising department. This naturally enables my department to maintain a high standard of pictorial presentation, and if proof were needed of the position the poster holds as an advertising medium, it would be unnecessary to go farther than to our resort people, who are not only glad to join us in this arrangement but who themselves place a high value upon the efficiency of the railway poster.

It may be interesting to mention that the L. N. E. procures from leading poster artists of the day all its poster designs. The lithograph printing is subsequently carried out by selected printers in that class of work and in certain cases the artist draws the design on the lithographer's stone to ensure greater accuracy.

As a test of the popularity of the railway pictorial poster, I may mention that many hundreds of copies of posters are sold to the public during the year, and for the last two seasons we have staged a poster exhibition with no small measure of success. I am, in fact, happy to recount that there is an ever growing interest in the artistic side of the railway advertising, and I feel there is still greater scope in this direction.

Newspaper Advertising

Newspaper advertising, however, is perhaps our most important medium and represents our greatest expenditure. Railway advertising matter does not, generally speaking, come within the ordinary categories of press copy. In the case of the L. N. E. campaign, the newspaper advertisements may be divided into two classes. First of all there is the railway newspaper announcement which is, in fact, a time table of excursion notices, to call attention to a bargain fare or a special train schedule, which at short notice must be made known to the public and could not be so effectively announced by any other advertising medium. In such advertisements the main considerations are clearness of type face, economy of space, and penetration by the use of the most suitable newspapers. In this connection space is taken regularly, usually on certain days in the week, and an endeavor is made to accustom the reader to rely and look for the announcements in a certain part of his particular favorite newspaper.

The second form of advertising may be classified as prestige or reminder advertising, and here there is much scope for originality and skill in the preparation of copy and display. Our daily papers with their enormous circulations, to-day carry as we all know a very large number of advertisements, and the appeal in the space available for individual copy must be immediate and to the point. Any suggestion which is being made must naturally get home to the mind without exacting much concentration on the part of the reader, and at the same time his interest must be aroused. I have experimented with many kinds of copy, sometimes introducing humor, sometimes various new type settings, while copy of the "reader" kind has from time to time met with considerable success. The subject of newspaper copy as applied to railways is, in fact, inexhaustible, and each season's campaign presents a new and intriguing problem. Suffice it to say that newspaper advertising forms about 40 per cent of the whole of my advertising budget, and it is upon this form of publicity that I place the greatest faith.

I should like now to turn attention to railway literature. Many experiments have been made in this direction and well-known writers have been called in to

supply manuscript for the really elaborate publications which have from time to time been passed on to a mildly interested public. There is each season a glut of travel literature in the market, much of which has been designed to sell certain forms of transport without, I fear, due regard or imagination as to what the public are likely to require. When contemplating a holiday or formulating the arrangements for such, my own opinion is that the public do not go to a railway office or station for literature in the ordinary accepted sense of the word. The railway bureau is not even a modest library for the dissemination of pleasant and readable books about the joys of travel. Such literature if desired at all, which I doubt, can be obtained in any library or bookshop, and our experience is that sketchy books on travel are not usually much in demand, in this country at any rate. I cannot imagine myself poring over a series of general propaganda guide books about any district however delightful. I would rather read a good novel about a district I know or long to know, and preferably one which has some compelling human interest or association. This argument is, I think, proved by the fact that when I introduced a new sales publication some two years ago on the subject of Yorkshire, there was very little desire to purchase the book, which was at its best, carefully veiled propaganda with little human interest, and I have to confess contained little information for the person who desired to follow the writer's enthusiastic urge to visit the district covered. I personally find the running narrative describing beauty spots to be visited a tedious thing to read from cover to cover, and I think to-day railway propagranda literature should take a more precise and practical form.

Holiday Resort Guides

Last year we made a departure by the introduction of a comprehensive holiday guide covering the whole of the territory served by my company, profusely illustrated with lively and human photographs, not merely representing the stereotyped view of the places we were endeavoring to advertise, but rather suggesting at the same time the atmosphere and the holiday mood which might be found there. The book also contained many accurate street plans, and the fullest information as to hotels, boarding house and other holiday accommodation. The success of the experiment may be quickly explained by the fact that in the first three weeks, 50,000 copies of the book were sold at 6 pense (i. e., 12 cents), a charge which previously had not been made for our literature, and a further 50,000 was quickly absorbed before the summer season was far advanced.

Literature Distributed Abroad

My policy in regard to literature supplied for the use of our agents abroad takes another form, as in this instance I think that a certain amount of general free literature has its place and is well justified. I may mention in this connection that I supplied our New York office with 410,000 pieces of literature for display in the States this year, while on the Continent 95,000 folders presenting the claims of England are to be distributed in 1930 and 32,500 copies of special literature in Australia and New Zealand.

Other methods of travel advertising to which brief reference may be made, are the production of lantern slides with suitable lectures on holiday districts, the exhibition of travel films on trans-Atlantic liners, and the railway representation at many of the leading international industrial fairs and exhibitions. It would be impossible to deal with these matters in detail, but it is anticipated that some interest will be attached to the Joint Railways Advisory Bureau, which for the first time will be introduced at the British Industries Fair at Olympia and in Birmingham. This bureau will be staffed by expert railway people, whose special function will be to advise both British and foreign visitors on all matters of railway transport, and a direct contact will be maintained by telephone between this advisory bureau and the responsible department railway officers at headquarters.

Joint Railway Advertising

Here I might mention that in various ways the railways of Great Britain work together closely on publicity matters common to us all, and some of you have doubtless noticed our joint propaganda, especially at holiday time when we issue announcements relating to cheap rail travel facilities. The machinery for the control and issue of these joint efforts is provided by the Railway Clearing House Advertising and Public Relations Committee, of which I had last year the honor of being chairman.

Before finishing I think you may like to have a few details of the organization of the L. N. E. Advertising department and our method of allocating our advertising budget and the adjustment of advertising expenditure according to the revenue results secured.

L. N. E. Advertising Department

The advertising manager is directly responsible to the chief general manager and the board for the advertising policy of the railway. His headquarters are situated in London. Under his direction are three area offices, each in charge of a responsible representative.

The policy and standard with regard to passenger train advertising is decided at headquarters, while the whole of the detailed arrangements are handled by the three area representatives. The station staff, district officers and personnel of agencies, are directly responsible to the advertising manager for all matters of propaganda. Other activities of the advertising department embrace steamship services, hotels, docks, freight train services, continental, overseas and American propaganda. The L. N. E. advertising budget is divided up into heads, and as expenditure is incurred, an analysis is made under the various allocations by the advertising accounts section. To keep within the budget the sectional chiefs at headquarters together with the responsible area representatives, are advised of the budget allocations at the beginning of each year. Frequent exchanges of statistics as to revenue pass between the passenger managers and the area advertising representatives, in order that the advertising expenditure may by regulated to accord with the potential earnings, and conferences are, of course, frequently convened between the advertising and the other departments it serves.

Our policy is to encourage new ideas, to experiment in the perfection of the pictorial poster, the layout and typography of all printed announcements, and no small amount of attention is given to the character and effectiveness of our railway literature. There is, however, as all advertising men well know, no limit to the development of advertising ideas, and each year, and even each month, something new suggests itself and maybe supersedes what was previously considered the last word in travel propaganda.

Communications and Books

Some Constructive Comments on Passenger Traffic Merchandising

DETROIT, MICH.

TO THE EDITOR:

The railways complain about the loss of passenger business. One of the reasons is lack of real transportation salesmanship. Let us consider the information bureaus which ought to be the real selling agency for transportation. There is nothing that the general public is less familiar with than railroad timetables. When a person walks into a store it is generally expected that he came in to buy something. When a person walks into an information bureau he is usually a potential passenger. The information clerk, however, frequently pays no attention to him unless he goes to the counter and asks for something. At some bureaus though he will be taken in hand immediately, shown every courtesy and given all the information he desires by a well-informed clerk who acts as though his actions were governed by his desires rather than by outside compulsion. At other such bureaus the prospective passenger will receive just what he asks for in a vague and uncertain manner, with the clerk acting as though railroading bothered him.

In Detroit I find the only real service being given by the two or three railroads and, being a street car conductor, I always send inquirers to one of these. Another road spends lots of money on passenger advertising, but would gain more by a better office force. Still another road is in about the same category because its ticket employees do not seem interested enough in prospective customers.

The well informed information clerk, when he sees a person walk in and look around, should say: "May I help you? We are offering an excursion to Pittsburgh for $6. It is an interesting trip and at one-third the regular rate." He should be well informed on train names and numbers. Too many of them leave it to passengers to find out everything, whereas they could be real salesmen.

There are, of course, many exceptions where really good service is provided. My old home is right outside of Baltimore Md., and I used to make many trips there and, having a fondness for railroads, usually used different routes. On one occasion I went to the information bureau at Mt. Royal station and asked for the rate to Detroit via a rather unusual route. The ticket agent informed me that he hadn't the rate right then but would get it and call me. I didn't expect to hear any more from him, but promptly the next morning he called me, gave me the rate and asked me if he should get the ticket ready. When I arrived at the station it was waiting.

One time I was riding in a day coach and was trying to make myself comfortable in the seat. A trainman, seeing me, threw over the seat ahead and told me to make myself comfortable. Last summer on a low-rate excursion the conductor was asked by a woman passenger if he would let her leave the train at a station where she knew an operating stop would be made and which was nearer the town in which she lived than the next regular stop. The conductor courteously informed her that he would stop the train and let her off at her own station.

Another bad feature of riding in day coaches is the practice of waking passengers up to inspect their tickets at every division point. This could be eliminated by putting up a card in a special holder above the window, writing the ticket number on it. This card should be in two pieces, the passenger being given one and the other placed in the holder. This would prevent fraud, while the conductor first lifting the ticket could turn it over to other conductors for the entire distance the train traveled without disturbing the passenger. A check could easily be made in case of doubt. The present practice of waking coach passengers at night is archaic.

I should suggest also that national park and other western tour literature list all the means of local transportation and all types of hotel accommodation with prices, instead of simply listing the ones favored by the various railroads. For example, there are persons of meager income who would be glad to make some such a trip and who have enough for rail fare with a small amount left over. They read the advertisements which tell them only of the luxurious accommodations and are thereby deterred from making the trip.

Real salesmanship in information bureaus might be promoted by having passenger representatives of one road visit the bureaus of other roads with their identity unknown. Good points peculiar to individual railroads would thus become common practice. It would also be an advantage if information clerks were sent to visit the various places to which they try to sell transportation so that they may be fully informed regarding the commodity they are supposed to sell.

GEORGE L. SNYDER.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Consolidation of Railroads. A discussion of the background of the Commission's plan and of the present problem. Illustrated. 16 p. 19 maps. Pub. by National City Company, New York City. *Apply.*

Descriptive List of Bureau Publications, March 1, 1930. Includes an historical sketch of the Bureau and lists publications now available. 8 p. Pub. by Bureau of Railway Economics, Washington, D. C. *Apply.*

Oral Argument, by E. R. Woodson, J. S. Burchmore, J. L. White, and Fred N. Oliver. In Ex parte 91, General Revision of accounting rules of steam railroads. Includes discussions of cost accounting and special cost studies. 32 p. Pub. by Railway Accounting Officers Association, Washington, D. C. *Apply.*

The Port of Hamburg, by Ralph I. Schneider. Foreign Port Series No. 1 of the Department of Commerce and the U. S. Shipping Board. "Communications" i.e. railways, steamship services, canals and connecting waterways, air services, radio and cables, p. 150-170. "Trade of the port of Hamburg with United States ports" p. 196-221. Origin of rail-borne commerce entering Elbe ports, and destination of rail-borne traffic leaving Elbe ports, p. 226-256. Rate conferences and railways rates, p. 284-295. Maps include No. 4, Principal railways of Germany, No. 5, Principal inland waterway systems of Germany, and No. 8, Origin and destination of Elbe ports rail-borne traffic. 326 p., 9 maps. Pub. by U. S. Govt. Print. Off., Washington, D. C. $1.

Report of Commission on Revision of the Public Service Commissions Law. New York State Legislative Document (1930) No. 71. John Knight, chairman of Commission. Discusses valuation for ratemaking purposes, control of holding companies and transactions between affiliated interests, accounting control, securities authorizations, reorganizations, mergers, etc., regulation of motor carriers, grade crossing elimination, and other problems relating to public utilities. 50 p. Pub. by J. B. Lyon Company, Albany, N. Y.

Uniform System of Accounts for Carriers by Air. Operating Revenue, Operating Expense, Income, Profit and Loss, General Balance Sheet and Real Property and Equipment Accounts. Unpaged. Pub. by Division of Air Mail Service, Office of Second Assistant Postmaster General, U. S. Post Office Department, Washington, D. C. *Apply.*

Valuation of Real Estate With Special Reference to Farm Real Estate—A Bibliography, compiled by Emily L. Day. "Railroad and public utility land valuation" p. 54-57. Agri-

cultural Economics Bibliography No. 29. 87 p. Pub. by U. S. Bureau of Agricultural Economics Library, Washington, D. C. *Apply.*

Periodical Articles

A Great Railroad Man Peers Into the Future, by Wm. S. Dutton. An interview with President Atterbury of the Pennsylvania on the characteristics of transportation not so many years hence. Illustrated. American Magazine, April 1930, p. 16017, 102-112.

Canada's Exploring Railroad, by Earl Hanson. Map and illustrations showing construction of the Hudson Bay Railroad. World's Work, March 1930. p. 76-80.

Railroads—The Hub of the Transport Era, by Neil M. Clark. An interview with President Sargent of the Chicago & North Western on transportation co-ordination. Illustrated. Forbes Magazine, March 15, 1930, p. 15-17, 40-42.

Railway Conditions in Cuba, by Frederick Todd. "Twenty Cuban railroad companies, representing 94.5 per cent of the mileage of all the public-service roads on the island, have reported upon operations, during the fiscal year ended June 30, 1929. The reports, however, do not reflect plainly the situation of certain properties that have been greatly affected by the recent expansion of highway transportation of passengers and freight in the region near Habana. * * * The decline in railroad traffic has been serious. * * * The railroads are urging the Cuban Government to establish some control over highway transportation. * * * " p. 737. Commerce Reports, March 17, 1930, p. 737-738.

Book Review

The Romance of the Rails, by Agnes C. Laut. Two volumes. 570 pages, 5½ in. by 8½ in. Bound in cloth. Published by Robert M. McBride & Co., New York. Price, two volumes, $7.50.

Using an informal conversational style which adds greatly to the interest and ease of reading, the author has presented a compact sketch of railroad development in the United States, in the course of which the glamorous idea of "romance" is never once lost. Largely non-technical, the greater part of both volumes is devoted to the high lights of railroad finance, particularly in its public aspects; management, with emphasis upon the characters of the great railroad men; and relations with state and federal governments. Engineering, technical and operating developments, however, are by no means neglected, especially in dealing with early construction, inventions and improvements.

After tracing the origin and early use of steam as a motive power, the author takes up the story of the first railways of the Eastern seaboard, depicting in graphic fashion their triumph over turnpike roads and canals. After following the expansion of the railway net across the Alleghenies, past the Great Lakes to and beyond Chicago into the prairies of the Middle West, she returns, at the end of the volume, to the post-Civil War East, to show how Vanderbilt and his consolidations were changing the railroad picture and how the machinations of Drew, Fiske and Gould were bringing railroad finance into an important, if unfavorable, limelight. The second volume is largely devoted to the story of the great transcontinental lines. Promotion, construction and early history of the more important trunk lines, as well as their effect upon the economic structure of the country as a whole, are dealt with in these pages. The closing chapters cover the rise of government regulation and railroad history before and during the World War, concluding with an admirable summary of the present railway situation.

Obviously pro-railroad in her sympathies, the author has nevertheless succeeded in estimating impartially the cause and effect of various situations in railroad development, giving ample praise where praise is due, but with no lack of criticism where such may be justified, an attitude which adds materially to the value of the book as a history. Although not exhaustive, the work contains much valuable historical material and much sound economic wisdom, so that it may well be read by anyone desiring a clearer comprehension of railroad problems

Looking Backward

Fifty Years Ago

The tendency to increase the loads of freight cars is strikingly shown by the fact that the United States Rolling Stock Company is now building 500 cars intended to carry 20 tons each. These cars will weight 20,200 lb. each, while the cars that the company has heretofore constructed weighed about 24,000 lbs. and had a marked capacity of 16 tons.—*Railway Age,* March 25, 1880

Simultaneously with the announcement of the increase of wages of employees on many of the leading railways, comes the news of strikes in various quarters. Yardmen and shopmen have gone out on a strike on practically every road at St. Louis, Mo., and East St. Louis, Ill., while on the Cumberland & Pennsylvania all the trainmen are on a strike.—*Chicago Railway Review,* March 20, 1880.

The Chicago, Milwaukee & St. Paul has added to its already extended system by purchasing the Sioux City & Dakota, extending from Sioux City, Iowa, to Sioux Falls and Yankton, Dakota, 131 miles, the Chicago & Pacific, extending from Chicago to Byron, Ill, 89 miles, and the Southern Minnesota, extending from La Crosse, Wis., to Flandrean, Dakota, 334 miles with branches, a total addition of 567 miles of lines now in operation. The present mileage of the Milwaukee is now more than 2,800 miles.—*Railway Age,* March 25, 1880.

Twenty-Five Years Ago

For the year 1905 there is great promise of activity in railway construction. More than 7,500 miles of new line are now either under construction or under contract, while there are 9,300 more miles of line which are projected and may be classed as "live projects."—*Railway Age,* March 24, 1905.

W. S. Battle, Jr., has been appointed general claim agent of the Norfolk & Western at Roanoke, Va. George Le Boutillier has been appointed engineer maintenance of way of the Cincinnati division of the Pennsylvania to succeed H. E. Newcomet, who has been transferred to the Erie and Ashtabula division.—*Railway Age,* March 24, 1905.

A runaway train on the Lake Champlain & Moriah recently made a remarkable leap from the end of a switchback. According to measurement, the train, consisting of a locomotive and seven steel gondolas loaded with iron ore, traveled about 300 ft. through the air before striking the ground, after running wild for two miles down a 4 per cent grade.—*Railway Age,* March 24, 1905.

The dispute between the Brotherhood of Locomotive Firemen and the Brotherhood of Locomotive Engineers, which a few weeks ago threatened to develop into a strike on the New York, New Haven & Hartford, has been settled. Hereafter an engineer who is a member of the firemen's brotherhood will be allowed to choose two disinterested engineers to represent him in grievances which he may desire to take before the New Haven management.—*Railroad Gazette,* March 24, 1905.

Ten Years Ago

Both the Erie and the Pennsylvania, upon their return to private operation, have effected radical changes in their organizations, involving the breaking up of their systems, each into four regions.—*Railway Age,* March 19, 1920.

Robert E. Woodruff, general superintendent of the Erie, Lines West, has been appointed manager of the Hornell region of that road. Henry W. Beyers, assistant traffic manager of the Chicago & North Western, has been promoted to freight traffic manager. J. M. Henry, assistant general superintendent of motive power of the Pennsylvania, has been appointed general superintendent of motive power of the Eastern region—*Railway Age,* March 19, 1920.

Odds and Ends of Railroading

Stork Meets the Meteor

The Meteor on the Frisco received an unexpected passenger recently when a baby boy arrived as the train was crossing Oklahoma. The new arrival was christened Frisco Whalen Short, in honor of the railroad, and of Bob Whalen, who was conductor on the Meteor that day.

News of the Model Builders

Milton Cronkhite is building on his estate at Greenwich, Conn., a miniature of the Pittsburgh division of the Pennsylvania at a cost of $35,000. Everything, even the scenery, will be on a scale of a quarter of an inch to a foot. He will have 600 pieces of rolling stock.

Just A Youngster

Press dispatches hail Walerjam Janowski, aged 93, of Zabkowice, Poland, as the oldest railway employee in the world. He has had 67 years' service. But with all that, Walerjam is just a kid beside Jimmie Horan, aged 95, who has been in active service on the Chicago, Milwaukee, St. Paul & Pacific for 76 years, come next Michaelmas.

Father of Southern Golf

H. F. Smith, senior vice-president of the Nashville, Chattanooga & St. Louis, who died recently at the age of 81, was not only one of the oldest active railway executives, but was largely responsible for the introduction of golf into the South. He was one of the organizers of the Southern Golf Association, and had been its president for over 25 years at the time of his death.

He Strolls on Banana Peels

To walk on banana peels is a hazardous undertaking for any man, but John J. Keefe, an electrician for the Illinois Central in New Orleans, has done it for 32 years without losing a single day from work. He also has never had a day off on account of illness. Mr. Keefe has indirectly helped to handle practically every bunch of bananas loaded in New Orleans in that time, as it is his duty to see that the electrical appliances at the wharves are in good condition.

Father-Son Combinations

While combing the country for instances of father-son combinations in engine cabs, we nearly overlooked our own organization. Marion B. Richardson, associate editor, Railway Mechanical Engineer, once fired for his father on the Bessemer & Lake Erie. He states that he remembers clearly that there was a lot of fault-finding from both sides of the cab. Mr. Richardson's father also fired several years for his father, Marion's grandfather, in passenger service on the Alleghany Valley, now generally known as the Low-Grade division of the Pennsylvania.

Well, Now That's Settled

Involving a claim of $300, a case which has dragged through the courts for more than 20 years, at an expense which is estimated in excess of the amount of the claim, has just been dismissed in the Minnesota supreme court because of lack of diligence in prosecution. The case grew out of an accident at a small town known as Grayling, Minn., on September 4, 1908, when W. J. Davis claimed a horse was killed, another injured and his wagon damaged by a Northern Pacific main line train while he was engaged in unloading logs close to a sidetrack. The railroad company disclaimed liability or responsibility for the accident. Suit was started in 1909. Through the score of years the case never came to trial, but it was revived in 1929 and the railway moved to dismiss in district court. The plaintiff appealed to the supreme court and there the lower court ruling dismissing the case was upheld. D. R. Frost, general attorney for the Northern Pacific, represented the railway company in the final phases of this case. There were numerous procedures in this case and considerable travel was required, involving time and expense.

Pontchartrain Centenary

The Pontchartrain railroad, one of the shortest lines in America, celebrated its one hundredth anniversary on January 20. Unlike any other railroad in the nation, the Pontchartrain railroad still operates under the name which it was given when its original charter was issued. Eight trips daily are made by the railroad's one train, running between Pontchartrain Junction and Milneburg, a distance of 4.96 miles. Twelve trips on Sundays are made to and from Lake Pontchartrain by the train, which has come to be known as "Smoky Mary," and its engineer, conductor, flagman and fireman. The train crew members have entire charge of the movements of the single train, there being no trainmasters, dispatchers or signals, inasmuch as there is no danger of collision.

Distillers Get No Aid From I. C. C.

Division 2 of the Interstate Commerce Commission, in a decision just made public that a first-class rate of $5.25 per 100 pounds on whiskey from Louisville, Ky., to Los Angeles and San Francisco, Calif., is not unreasonable, and that there are good reasons why whiskey should pay a higher rate than the $1.36 applied on shipments of grain alcohol, at the same time took occasion to ascertain that there is no cross-hauling of whiskey from Los Angeles and San Francisco to Louisville at a lower rate of $1.28, as alleged by the complainant distillery companies of Louisville. A tariff check reveals, the commissioners found, that this rate did not apply on whiskey. Complainants contended that whiskey should take a rate of $2.415, based on the grain alcohol rate of $1.36 plus 68 cents to reflect the greater value of whiskey and plus another 37.5 cents to represent 10 days' policing of the shipment at $15 a day, but the commission was impressed by the railroads' point that police protection is not required to the same degree in the case of grain alcohol and that "whiskey is much easier for a thief to handle on account of its being ready for immediate consumption." The report reveals that the rate on whiskey between the points mentioned was raised from $4.55, second-class, on April 30, 1928, and that Division 3 found that rate not unreasonable on a complaint in which the distillers sought the application of the rate on drugs and medicines.

* * *

One of Southern California's Quaint Eating Houses

NEWS *of the* WEEK

Southern Pacific Freight Train, with a 4-8-2 Locomotive, in the Sierra Nevada Mountains

THE CLEVELAND (OHIO) RAILWAY CLUB will hold its next meeting on Monday evening, April 7, at Hotel Hollenden.

THE NATIONAL SAFETY COUNCIL will hold its congress this year at Pittsburgh, Pa., beginning September 29.

THE CANADIAN RAILWAY CLUB will hold its next meeting at the Windsor Hotel, Montreal, on Monday evening, April 14. The speaker will be E. W. Beatty, president of the Canadian Pacific.

THE NEW ENGLAND RAILROAD CLUB will hold its next meeting at the Copley-Plaza Hotel, Boston, on Tuesday evening, April 8. G. T. Wilson (N. Y. C.) will read a paper on the Hudson type locomotive.

THE CAR FOREMEN'S ASSOCIATION OF CHICAGO will hold its next meeting at the Great Northern Hotel, Chicago, on Monday evening, April 14. The discussion will be on the proposed changes in interchange rules.

THE RAILWAY CLUB OF PITTSBURGH will hold its next meeting at Fort Pitt Hotel, Pittsburgh, on Thursday evening, March 27. "Foundation Stones on which a Successful American Railroad is Built" will be discussed by R. P. Forsberg, principal assistant engineer of the Pittsburgh & Lake Erie.

THE HOUSE COMMITTEE on interstate and foreign commerce is expected to begin its investigation of the ownership of railway securities by holding companies and others about April 1. Dr. W. M. W. Splawn, who has been retained by the committee as special counsel, has been working on a program of procedure to be considered by the committee at an early meeting and it is planned to send out a questionnaire to holding companies, investment trusts, etc., asking them to report the extent of their holdings.

THE DELAWARE, LACKAWANNA & WESTERN has announced that its new terminal warehouses at Jersey City, N. J., will be opened for receipt of freight now under contract on or about the first of April, although the formal opening will not take place until approximately May 1. The new building, located between Sixteenth and Eighteenth streets and Henderson street and Jersey avenue, and adjacent to the Holland tunnels, is 848 ft. by 163 ft., with a total floor space of 1,240,000 sq. ft. and a storage capacity of more than 100,000 tons.

D., T. & I. and Pennsylvania

The Pennsylvania and the Detroit, Toledo & Ironton have recently completed the consolidation of several facilities on the lines of the two roads. The D., T. & I. freight station at Springfield, Ohio, was closed on March 11 and the handling of freight at that point was transferred to the Pennsylvania freight station. On March 1 the Pennsylvania engine house at the same point was abandoned and locomotive service has since been performed at the D., T. & I. engine house. Detroit, Toledo & Ironton passenger trains began the use of the Fort Street station at Detroit, Mich., on March 10, enabling the road to enter the downtown section of Detroit, in place of the former terminus at Dearborn.

Motor Coach Bill Debated in House

The Parker bill to provide for the regulation by the Interstate Commerce Commission of interstate passenger motor vehicle traffic on public highways has been the subject of intermittent debate in the House since March 12 and it was expected on March 19 that a vote might be reached on the following day. Much of the debate has consisted of prepared speeches on the bill by members of the committee on interstate commerce and explanations of provisions of the bill in response to the questions of others who were less familiar with it. The principal opposition during the early stages of the debate was based on the provision in the bill for reference of questions to joint boards of state representatives for recommendation to the Interstate Commerce Commission only as to matters involving only two states and on March 18 an amendment was adopted, offered by Representative Mapes, of Michigan, providing for joint boards when not more than three states are involved. This was adopted by a vote of 134 to 45. Mr. Mapes also said he would offer another amendment giving discretion to the commission to refer to joint boards questions involving more than three states. There was also some opposition to the bill on the ground that it proposed to protect existing operators from competition.

Freight Traffic in January

The volume of freight traffic handled by the Class I railroads of this country in January amounted to 36,664,266,000 net ton-miles according to reports compiled by the Bureau of Railway Economics. Compared with January, 1929, this was a reduction of 2,545,370,000 net ton-miles, or 6.5 per cent, but it was an increase of 375,472,000 net ton-miles, or 1 per cent, compared with January, 1928. In the Eastern district, the volume of freight traffic in January this year was 4.7 per cent less than that in the same month in 1929, while the Southern District reported a reduction of 6.9 per cent. In the Western district, there was a reduction of 8.8 per cent.

The daily average movement per freight car in January was 28.2 miles, as compared with 29.5 miles in January, 1929, and 27.6 miles in January 1928.

The average speed of freight trains in January was 13.3 miles per hour, an increase of four-tenths of one mile above that for the same period last year and an increase of seven-tenths of one mile above that for January, 1928.

The average load per car in January this year was 27.6 tons, including less than carload freight as well as carload freight. This was an increase of one-tenth of one ton above the average for January 1929 and an increase of four-tenths of one ton above that of January, 1928.

Safety Precepts for April

E. R. Cott, chairman f the Committee on Education of the Safety Section, A. R. A., in circular No. 255, proposing a program for the attention of safety departments during the month of April, takes for his text, the foreman's responsibility for the safety of his men.

Quoting from a paper by the chairman of the Section, Mr. Cott discusses the importance of the foreman as the keystone of his organization. The foreman interprets the wishes of the management to the men and the needs of the men to the management. A foreman is not simply a better mechanic, he must be capable

ot leadership; he has vision as do all competent men, but he also has supervision which means not merely superintendence but *better* vision. The competent leader not only is a thinker but he inspires his men to think.

The foreman is exhorted to think specially about the new man, the youngster just entering industry. In selecting a machine, the foreman exercises his best forethought; should he not exercise the same care in selecting men? For a machine, a substantial foundation is built; take care to build a substantial foundation for the new man. "Go with him to the job and introduce him to his new associates; make him feel at home and among friends. At this time, he is more susceptible to the foreman's good influences than he will ever again be; he wants to learn, he wants to do right, he wants to like his boss. If the foreman fails to take advantage of this opportunity, he may miss it forever, for a little later, perhaps, other and unfriendly influences may guide and alienate him."

To tell a man not to get hurt is too indefinite; show him how and where liability to injury exists. The injunction to the man may have to be repeated many times. The employee must be made to believe in the utter sincerity of the foreman. Remember the difference between discipline and punishment. Discipline is teaching, punishment is a penalty to be applied only after teaching has failed.

If a foreman has failed to prevent an accident, he has a definite duty to perform after that accident occurs. A foreman should make it a rule in the case of an injury, to accompany the injured man to the surgeon, keep in touch with him, see that his family does not suffer, etc.

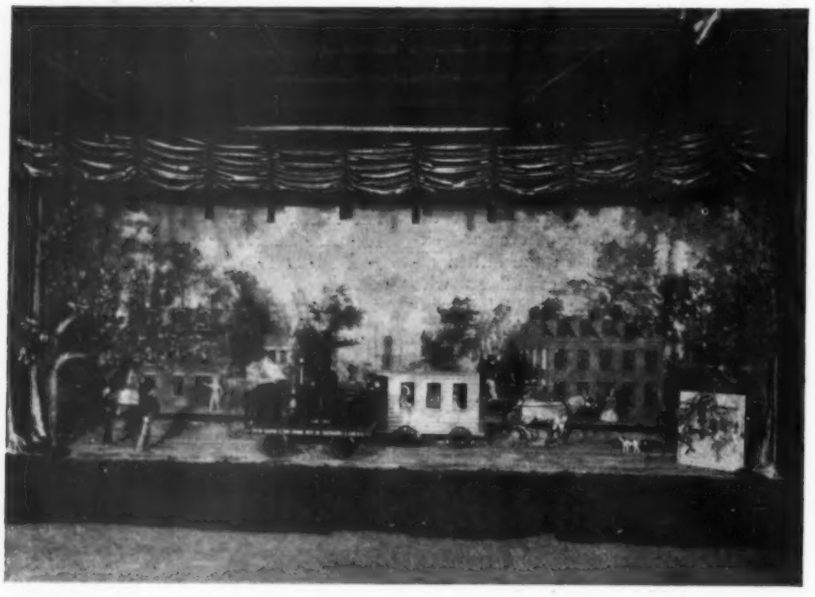
The ideal foreman educates his men so thoroughly that they do as well when he is absent as when he is present; if you get them to believe thoroughly in your leadership, you will develop them into heart servants instead of eye servants.

Story of Transportation Shown in Tableaux

An exhibition showing the history of transportation in America has recently been completed in New York by Messmore & Damon, creators of mechanical advertising displays. Arranged in ten tableaux, each designed to show an important step in the development of modern transportation, the complete exhibition required about one and one-half years of research and production work and cost about $150,000. Each of the individual tableaux occupies a space of from six ft. by fourteen ft. to seven ft. by twenty ft., but is so arranged on a framework of sectional tubing that the entire exhibit can be packed and moved on a single specially designed truck. Ground and water effects, borders and backgrounds are painted on rubberized cloth, while figures appearing in the scenes are carved from wood and are about one-third life size. Many of the various vehicles used are actual working models and all details of costume, scenery, harness, etc., are historically correct.

In chronological order, the subjects of the ten tableaux are as follows: The Indian drag; the Conestoga wagon; Fulton's steamboat "Clermont"; the famous race, on August 30, 1828, between the Baltimore & Ohio's first locomotive, the "Tom Thumb," and the gray mare; the Deadwood stage coach; the Pony Express; the coach used by Lincoln during his presidency; the race between the Mississippi river packets "Robert E. Lee" and "Natchez" from New Orleans to St. Louis; the first gasoline automobile, the invention of George B. Selden; and the first successful flight of the Wright brothers at Kitty Hawk, N. C.

The exhibition, which is said to be the only one of its kind ever prepared, is soon to be taken on a coast-to-coast tour.



Criterion Photo

The Fourth Tableau in Messmore & Damon's Exhibition of the History of Transportation Shows the Race, in 1828, Between the Baltimore & Ohio Locomotive "Tom Thumb" and the Gray Mare

Traffic

The Atlantic States Shippers' Advisory Board will hold its twenty-third regular meeting at Traylor Hotel, Allentown, Pa., on Thursday, April 3.

The Central Claim Conference and the Southeastern Claim Conference will hold a joint meeting at Louisville, Ky., on April 22 and 23.

The Transportation Club of San Francisco, (Cal.) at its meeting on March 10, elected as president for the ensuing year H. H. Pierson. The secretary is Roscoe C. Bray.

The Interstate Commerce Commission has postponed from April 22 to May 19 the hearing at Newark, N. J., on the complaint filed by the state of New Jersey and the New Jersey Traffic Advisory Committee involving New York lighterage charges. The hearing is to be before Chairman McNanamy and Examiner Steer.

Allegheny Board Sees Increase

The Allegheny Regional Advisory Board held its regular meeting at Pittsburgh, Pa., on March 13. A summary of the commodity reports indicates an expected increase of 50,922 cars, or five per cent, in the demands of shippers of carload freight in the Allegheny region during the months of April, May and June, as compared with last year.

Among the increases predicted are cement, 33.5 per cent; machinery, 14.6 per cent; boilers, 36.9 per cent; coal and coke, 9.3 per cent; gravel, 11.3; building sand, 14.5; stone, etc., 20.3; agricultural implements, 9.1; paving brick, 10.2; slag, 15.2.

In iron and steel there is predicted a decrease of 3.7 per cent; in common brick, 7.9 per cent; earthenware and pottery, 17 per cent; iron and steel scrap, 7.8 per cent and glass sand, 12.6 per cent.

In commodities not named in the foregoing paragraphs, little or no change is expected.

In coal and coke, the tonnage of which constitutes about one-half the total car load traffic originating in this region, estimates vary considerably in the different districts. In the Central Pennsylvania low volatile district, the estimated increase is 14.1 per cent and in Northern West Virginia, it is nearly the same; but in the high volatile district of Western Pennsylvania, the figure is 8.4 per cent and in Eastern Ohio, it is 7.3 per cent.

The next meeting of the Allegheny Board will be held at Morgantown, W. Va., on June 12.

Lake Cargo Rate Controversy Re-Opened

Western Pennsylvania and Ohio coal operators have filed with the Interstate Commerce Commission complaints seeking to reopen the lake cargo coal rate controversy, involving the relationship

between rates on bituminous coal from the "southern" and "northern" coal fields to Lake Erie ports for transshipment, which has been before the commission in various forms since 1912 and has been variously decided by the commission at different times. Complainants allege that the present rates from the Pennsylvania and Ohio fields subject those districts to undue and unreasonable prejudice and disadvantage as compared with the rates from the southern district fields in Virginia, West Virginia, Kentucky and Tennessee, which since January 1, 1929, have been 35 cents per ton higher than the rates from the northern fields. The 35-cent differential was arrived at by a compromise between the railroads serving the northern and southern fields after the commission had ordered a reduction in the northern rates which would have established a 45-cent differential and after the southern roads had made a 20-cent reduction which re-established a 25-cent differential. The complaints do not ask for a specific differential but that the commission prescribe a scale of lake cargo rates which will not prejudice the northern fields and prefer the southern mines.

The complaints omit the allegation of unreasonableness made in previous cases, but seek to have the commission deal with the question of relationship. The commission is also asked to invoke its maximum and minimum or maximum or minimum rate powers in prescribing the rates.

In 1925 the commission held that the rates were not unreasonable but in 1927, after further hearings, it ordered the reduction from the northern fields. The case was made a political issue in Congress and was also taken to the federal courts but the Supreme Court held it to be moot after the compromise rates were put into effect.

Nine-Foot Channel Urged for Upper Mississippi

Vigorous efforts are being made by the advocates of the plan for the deepening of the channel of the upper Mississippi river between the mouth of the Missouri and the Twin Cities to commit the government to a nine-foot project, in place of the present six-foot project, without awaiting the results of a survey being made by the Army engineers.

The entire Minnesota delegation in the House and Senator Schall called on President Hoover at the White House on March 12 to urge his support for the proposal, although the Board of Engineers for Rivers and Harbors, in a report recently submitted to Congress, recommended that action should be deferred until a survey now being made by a special board of engineers is completed. It was stated afterward by members of the delegation that the President was favorable to the project provided the work and the cost is spread over a long period of years.

The special board, which recently submitted an interim report, estimated the cost of the project at $98,000,000 and proposed an immediate authorization of an expenditure of $50,332,000. The Board of Engineers reported that it would be unwise to base a recommendation on the information now available and the Chief of Engineers recommended that all permanent structures to be built under the existing 6-foot project be executed with a view to being adapted for an ultimate depth of nine feet.

The district engineer at Rock Island, Ill., to whom was assigned the preliminary examination directed by Congress, twice submitted unfavorable reports, but a survey was ordered by the board after a review.

President Hoover has advocated the eventual establishment of a 9-foot depth in the "trunk system" of the Mississippi, although saying that some of the tributaries should first be made accessible to traffic at 6 or 7 feet.

G. N.-C. P. Interchange at Winnipeg

Arrangements have been completed for an open interchange between the Great Northern and the Canadian Pacific at Winnipeg on all classes of one-way and round trip passenger traffic. Under this interchange, the route by way of the Great Northern from St. Paul, Minn., Duluth, Wis., and Sioux City, Iowa, to Winnipeg, Man., thence over the Canadian Pacific will be shown in all westbound tariffs to all stations on the Canadian Pacific and to points south of Vancouver, B. C., and Kingsgate, at fares now applicable by way of the Minneapolis, St. Paul & Sault Ste. Marie to Emerson, and thence over the Canadian Pacific. Similar routes by way of the Canadian Pacific to Winnipeg, thence over the Great Northern to St. Paul, Duluth or Sioux City will be shown in eastbound tariffs from points south of Vancouver or Kingsgate by way of these gateways, at fares now applicable by way of the Canadian Pacific to Emerson, thence the Soo Line to St. Paul or Duluth. Summer tourist tariffs for the season of 1930 will contain this new route, and will be included in one-way tariffs as they are supplemented.

Arrangements have also been completed for summer tourist fares covering a circuit tour going to Glacier Park or Belton, including motor coach to the Prince of Wales Hotel, motor coach to Calgary, the Canadian Pacific to Banff or Lake Louise and to Winnipeg, and thence the Great Northern or the reverse of this route from St. Paul, Minneapolis, Duluth, Minn., and Superior, and territory on other lines east thereof. Round trip fares for this tour will be made by using one-half of the summer tourist fare from the starting point to Glacier Park, plus one-half of the summer tourist fare from the starting point to Banff or Lake Louise, as the case may be, plus an arbitrary of $27.75 between Glacier Park and Banff and $28.75 between Glacier Park and Lake Louise. This amount covers the motor coach fare between Glacier Park and Calgary and rail fare by way of the Canadian Pacific between Calgary and Banff or Lake Louise. Correspondingly low fares for the circuit tour will be authorized from Spokane, Wash., Seattle, Tacoma and Portland, Ore., as well as from stations on other lines located south of those points.

* * * *

Driving the Golden Spike to Complete the Laying of 130-Pound Rail on the Pennsylvania from New York to Chicago

The oldest track foreman on the Pennsylvania's Chicago payroll, Ed Brown, with nearly half a century of service, was given the honor of driving the golden spike which completed the Pennsylvania's 908-mile stretch of 130-pound rail. Looking on, from left to right, are C. E. Hochstedler, traffic director, Chicago Association of Commerce; Col. Robert I. Randolph, president, Association of Commerce; Gilbert Scribner, Chicago Real Estate Board, and Daniel H. Burnham, secretary of the Chicago World's Fair.

Foreign Railways

Sir Harold Hartley Named Vice-President of L. M. S.

Sir Harold Hartley has been appointed vice-president in charge of works and ancillary undertakings and director of scientific research of the London, Midland and Scottish (Great Britain), according to an official announcement by the board of directors of that company. He succeeds the late R. W. Reid, who was also director of scientific research.

Born on September 3, 1878, Sir Harold Hartley was educated at Dulwich College and at Balliol College, Oxford, where he specialized in natural science. Following his graduation he became, in 1901, a Fellow and tutor at Balliol, where he remained until the outbreak of the World War, when he joined the British army as a captain in the Seventh Leicestershire Regiment. From 1915 to 1917 he served as chemical advisor to the Third Army; from 1917 to 1918 as assistant director of gas services attached to the general headquarters of the British Army in France, and from 1918 to 1919 as controller of the Chemical Warfare department of the Ministry of Munitions.

Soon after the close of the war he returned to Oxford in his former capacity as tutor and lecturer on physical chemistry. In 1926 he was elected a Fellow of the Royal Society and two years later was knighted. Since 1922 he has been a director of the Gas Light & Coke Company and a member of that company's works supervision committee. He is also a member of the British government's Fuel Research Board and has served on several government committees dealing with the application of scientific research to various practical industrial problems.

In his new position as vice-president of the London, Midland & Scottish, Sir Harold will exercise general supervision over all technical departments and will have charge of certain important developments in the application of scientific research.

Chinese Government Railways

The eleventh annual report of the Chinese Government railways, covering operations for the year ending December 31, 1925, has recently been issued from Nanking. The introductory statement calls attention to the fact "that the unfavorable trend in the conditions surrounding the Government Railways, which may be said to have had a beginning in 1919, has continued into 1925 . . . . The delay of the various railways in submitting their reports, due to their disorganized condition following many years of disturbances, has resulted in delaying the compilation of this report." The report was compiled by the Statistics division of the Chinese government Finance Department.

Some of the lines in the government system did not report for the year under review. Those reporting operated 7,001 kilometers of line as against 7,035 kilometers operated by those lines reporting for the year ending December 31, 1924. Dollar figures used in the report refer to the silver dollar, the equivalent of which is approximately 50 cents in United States money.

On this silver basis, therefore, the reporting roads collected $124,565,253 in gross revenues during 1925 as against a 1924 gross revenue figure of $118,511,264. The operating expenses for 1925 were $70,396,388 and net revenues $54,168,864; comparable 1924 figures were respectively $67,378,396 and $51,132,868. Surplus for the year 1925 was reported as $30,566,094, an increase of 13.1 per cent over the $27,028,872 surplus reported for 1924.

During the year 39,715,720 passengers were carried and 27,718,185 long tons of freight were hauled, the traffic in each class having decreased from that for the previous year. The decline in passenger traffic was 3.8 per cent and in freight traffic 7 per cent. The report lists 113,091 employees in 1924 and 119,434 in 1925, an increase of 5.6 per cent. It should be pointed out in connection with these comparisons of one year with the other that the reports of some lines may be absent from either of the compilations on which the comparisons are based.

The report states that all lines on December 31, 1925, showed an accumulated net surplus of $184,837,969. It continues to point out, however, that "the value of this surplus is seriously affected by large amounts under Temporary Advances to Government and under Miscellaneous Deferred Debits. The former amounted to $57,314,414 and the latter to $57,479,277." Some of these, however, are offset by neutralizing credits.

Southern of Great Britain Announces 1930 Plans

The 1930 budget of the Southern of Great Britain, recently made public, calls for the expenditure of approximately £4,300,000 ($20,900,000) on the purchase of new equipment, improvements to existing facilities and extension of electric operation during the current year.

New equipment to be ordered includes 20 express passenger locomotives of the 2-6-0 type; 10 three-cylinder freight locomotives; about 300 new corridor coaches; 16 dining cars; 130 additional passenger-train cars of other types; special coaches for operation on electrified lines; and 2,000 freight cars of various types, including 100 refrigerator cars. Expenditure for this purpose will total £1,195,000, or well over one-quarter of the entire budget. Some of the new coaches will represent a departure from the usual standards for main line passenger equipment on British railways, in that they will be constructed with center aisles instead of with side corridors. The railway also plans to purchase 35 motor trucks of various capacities for the extension of its store-door delivery service.

The most important building projects for the year are the reconstruction of Exeter station at a cost of £197,000 and the construction of a new customs shed at Dover, at a cost of about £96,000. In addition to these improvements, additional main tracks are to be constructed and the station reconstructed at Headcorn; a freight house at Battersea is to be remodelled as a repair shop, and quay extensions and installations of new loading equipment are to be carried out at Padstow and Nine Elms, while other improvements have been authorized at various points. Over £1,000,000 of the 1930 budget will be spent on the completion of projects begun or authorized in 1929, including new stations at Hastings and Manor Road, and extensive dock improvements at Southampton.

Approximately £600,000 will be spent on the electrification of lines between Twickenham and Windsor (27 miles), Dartford and Gravesend (14 miles), and Wimbledon and West Croydon (8 miles). It is planned to have electric trains in operation on all three of these lines by early summer. These projects are in addition to the electrification of the main line from London to Brighton and of the Reigate, Redhill and Worthing branches, work on which was authorized late in 1929.

Two new steamers for the Channel Islands service and two new passenger steamers and a new automobile ferry for the Portsmouth-Isle of Wight route, all ordered in 1929, will go into commission during 1930.

Nigerian Railways in 1928-1929

The report of the Nigerian Railway system for the fiscal year ending March 31, 1929, as reviewed in the Railway Gazette (London), shows that new high records were attained in gross revenues and in the number of passengers carried, while net operating revenues for the year amounted to more than $4,000,000.

Total revenues were £2,528,107 ($12,286,600), an increase of £92,696, or $450,503, over those for the fiscal year ending March 31, 1928. Of this, £1,599,138 ($7,771,811) were distributed in operating expenses, which showed an increase of £89,239 ($433,702) in 1928-1929 over those for 1927-1928. These expenses included £336,412, an increase of £13,543, for renewals. This increase in operating costs, although less than that in gross revenues, was sufficiently large to bring the operating ratio up from 62 per cent to 63.25 per cent. Net operating revenue totaled £928,969, or $4,514,789, an increase of £3,464 ($16,835) over the net of £925,505 ($4,497,954) reported for the year ending March 31, 1928.

The operating revenues were divided as follows: £317,440, or $1,542,758, from the carriage of 3,161,633 passengers, an increase of £18,193 ($88,418) over the 1927-1928 passenger revenue; £1,815,299, or $8,822,353, from freight operations, an increase of £92,638 ($450,221) over the freight revenues for 1927-1928, and £395,368 from miscellaneous operations. The increase of 330,668 in the number of passengers carried was due mainly to the

improvement of suburban services in the vicinity of Lagos and Port Harcourt, while the increase in freight revenues came chiefly from increased loading or longer hauls of government freight, ground nuts, cocoa and tin concentrates.

A total of 3,313,138 train-miles were operated during the year, while long ton-miles amounted to 207,236,334. The total route mileage of the system on March 31, 1929, was 1,706 miles, chiefly of 3 ft. 6 in. gage. Of this amount, 107 miles represented new lines opened to traffic during the year. On October 1, 1929, 74 additional miles of line were placed in service, and construction is now in progress on two other lines, totaling 123 miles. Equipment in service on March 1, 1929, amounted to 231 locomotives, 292 passenger cars and 3,456 freight cars, each class of equipment showing an increase during the fiscal year covered by the 1928-1929 report.

Spanish Railway Developments

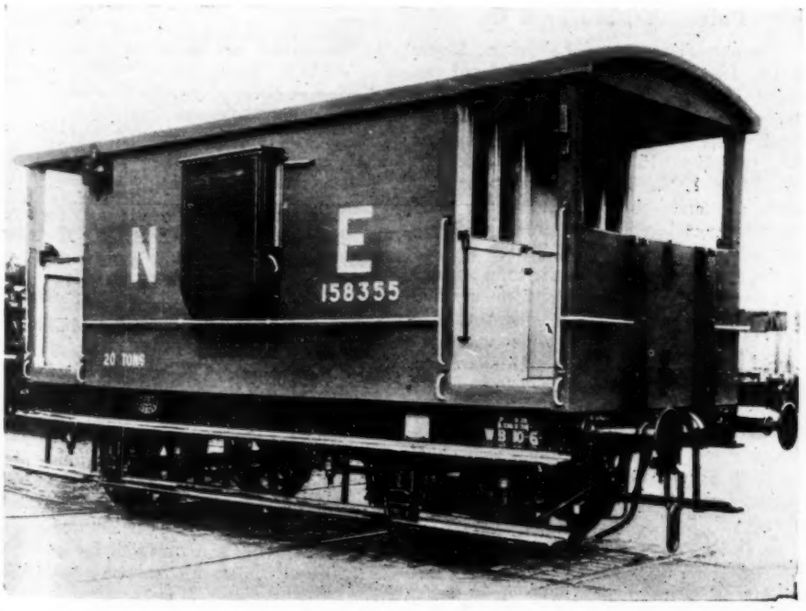
According to Department of Commerce reports, the Andaluces Railway, the most important system in southern Spain, has recently consummated the purchase of the Sur de Espana lines, acting under authority of a royal decree published on August 3, 1929. The price of the purchase was given as 19,520,795 pesetas (approximately $2,732,900) for 60,000 shares of Sur de Espana stock, and 15 pesetas each for the 57,127 participating bonds in circulation, a grand total of 20,376,700 pesetas ($2,852,865). The Sur de Espana lines, which have been operated under lease by the Andaluces for a number of years, extend from the port of Almeria to Granada and other interior points, and total 339 kilometers (210 miles) in length. Their gross earnings in 1928 were 11,859,259 pesetas (about $1,660,275). Following the merger, the Andaluces system comprises 1,644 kilometers (1,021 miles) of broad gage (5 ft. 6. in.) track, with an estimated property value of 302,234,309 pesetas ($42,312,800).

The Andaluces Railway is also planning on the electrification of 542 kilometers (337 miles) of its lines, at an estimated cost of 80,000,000 pesetas ($8,400,000). Work will not be started, however, until after the formation of a syndicate of producers of electrical energy under the provisions of a royal decree of September 7, 1929, creating a "Council of Energy" to develop plans for cheap electric power for railroads and other industries.

Work is in progress on a number of links in a new government railway, planned eventually to provide a short route from southern Spain to the northern frontier, via Teruel and Lerida, while surveys for other sections are being made. Of the construction now under way, the most important link is that of 140 kilometers from Baeza Junction, where connection is made with Madrid, to Utiel, 88 kilometers from the port of Valencia.

L. N. E. Tests Concrete Caboose

A concrete brake van, or caboose, has recently been completed by the London & North Eastern, of Great Britain, at its Temple Mills (London) shops. The new car is equipped with a standard steel underframe and standard fittings, but its sides, floor and roof are made of concrete reinforced with steel. Some of the main girders are anchored in the concrete floor to avoid the necessity of using holding bolts. The wooden caboose cars heretofore used in Great Britain have been weighted with cast iron ballast to give added braking efficiency, but the weight of approximately 20 tons secured by building the new car of concrete makes such ballast unnecessary. If the new car successfully meets service conditions, other similar cabooses may be built.



International News

The London & North Eastern's Concrete Caboose

Equipment and Supplies

Locomotives

THE LAMM LUMBER COMPANY, Modoc Point, Ore., has ordered one 2-8-2 type locomotive from the Baldwin Locomotive Works.

THE ELGIN, JOLIET & EASTERN has ordered eight 2-8-2 type locomotives from the Baldwin Locomotive Works. Inquiry for this equipment was reported in the *Railway Age* of March 1.

THE CANADIAN PACIFIC has ordered 10 locomotive tenders from the Montreal Locomotive Works. This is in addition to 10 tenders ordered from the same builder and reported in the *Railway Age* of March 1.

Freight Cars

THE FREEDOM OIL WORKS is inquiring for five tank cars of 6,000 gal. capacity.

THE PACIFIC FRUIT EXPRESS has ordered 500 refrigerator cars from its own shops at Roseville, Cal., and Los Angeles.

THE NATIONAL TUBE COMPANY has given an order to the Koppel Industrial Car & Equipment Company to make repairs to 25 hopper coke cars.

THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC has decided not to purchase the 750 stock cars for which inquiry was reported in the *Railway Age* of January 11.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has ordered 200 box cars from the Standard Steel Car Corporation, and 200 hopper cars from the Pullman Car & Manufacturing Corporation.

THE NORFOLK & WESTERN has given a contract to the Virginia Bridge & Iron Company for the rebuilding of 1,000 57½-ton hopper cars. Inquiry for this work was reported in the *Railway Age* of March 1.

Passenger Cars

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered five steel baggage cars, 70 ft. long, from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of February 22.

THE REPORTS in these columns last week that the Detroit & Mackinac and the Texas-Mexican had each ordered one car from the Bethlehem Steel Company were duplications of previous news items reporting the same orders.

Supply Trade

Frank B. Hamerly, works manager of the **Independent Pneumatic Tool Company**, Chicago, with headquarters at Aurora, Ill., has been elected vice-president in charge of manufacturing.

G. A. W. Bell, Jr., maintenance inspector on the staff of the chief engineer maintenance of the Baltimore & Ohio, has resigned to enter the sales department of the **Northwest Engineering Company**, with headquarters at Washington, D. C.

Frank W. Curtis has been appointed research engineer of the **Kearney & Trecker Corporation**, Milwaukee, Wis., makers of milling machines. Until recently Mr. Curtis was connected with P. R. Mallory & Company Inc., Indianapolis, Ind., as chief engineer in charge of Carboloy manufacture and developments.

F. A. Lorenz, Jr., assistant vice-president in charge of operations of the **American Steel Foundries**, Chicago, has been appointed general manager of the Indiana Harbor and Pittsburgh works, in charge of sales and production. A portrait of Mr. Lorenz and a sketch of his career were published in the *Railway Age* of April 6, 1929.

George B. Powell has been appointed district sales manager of the **American Locomotive Company** and the **Railway Steel-Spring Company** with headquarters at Syndicate Trust building, St. Louis, Mo. Mr. Powell has had a long experience in the railway supply and manufacturing field in the St. Louis district. For over twenty years he was located at the St. Louis plant of the Spring Company, leaving the position of manager of the plant in 1925 to become sales agent of the Spring Company in that district. He now also succeeds to the position left vacant by the death in February of Edward C. Fisher.

American Locomotive Company Annual Report

Net income of $6,851,300, after allowance for depreciation and federal taxes, was reported by the American Locomotive Company for the year ending December 31, 1929, according to the annual report issued on March 6. This amount compares with a 1928 net, after depreciation and taxes, of $4,171,296. The 1929 net was equivalent to $5.40 per share on the 770,000 shares of common stock outstanding as compared with an equivalent 1928 figure of $1.92.

Preferred dividends during the year totaled $2,695,000 while additional dividends of $6,160,000 were paid on the common stock. Of this latter amount, 1929 earnings provided $4,156,300 and the remaining $2,003,699 was drawn from surplus.

On December 31, 1929 current assets exceeded current liabilities by $34,276,103. There were no loans payable, while the company had in its treasury a surplus of $19,103,464 in cash and marketable securities, of which $7,588,757 was in United States government obligations; $4,987,444 in railway equipment trust certificates; $1,538,434 in Canadian government bonds; $623,841 in other securities, and $4,364,988 in cash on hand and in banks.

During the year the company acquired 97 per cent of the capital stock of the McIntosh & Seymour Corporation of Auburn, N. Y., manufacturers of Diesel engines.

Selected items from the consolidated income statement follow:

	1929	1928
Net earnings from all sources, after deducting manufacturing, maintenance and administrative expenses	$8,796,039	$5,793,192
Depreciation on plants and equipment	1,430,489	1,507,096
	7,365,550	4,286,096
Accrual for Federal taxes	514,250	114,800
Profit for the year	6,851,300	4,171,296
Dividends—Preferred stock	2,695,000	2,695,000
Common stock	6,160,000	6,160,000
Deficit after dividends	2,003,699	4,683,704

William H. Woodin, chairman, in his message to the stockholders says: "The demand for new locomotives by the railroads in the United States showed a marked improvement during 1929 over the abnormally poor locomotive business of 1928. The betterment and replacement programs of the railroads for 1930, recently published, encourage the belief that new locomotive buying during 1930 will not compare unfavorably in volume with that of the past year. On January 1, 1930, the unfilled orders on the books of the company amounted to $17,834,363, as compared with $18,978,879 on hand January 1, 1929."

Fairbanks, Morse & Co.

The annual report of Fairbanks, Morse & Co. for 1929 shows a consolidated net profit for the year, after provision for depreciation, debenture interest, pension fund contributions, and federal income tax, of $2,240,615 as compared with $2,161,671 in 1928. Preferred and common stock dividends absorbed $1,592,017, leaving a balance of undivided profits of $486,500, which, added to the adjusted surplus at the end of 1928, brings the total surplus and undivided profits of the company and its subsidiaries at the close of the year to $13.536,463, giving a book value of $58.51 per share to the 368,977 shares of common stock outstanding. After deducting the preferred stock dividends from the net profit for the year, the balance remaining for the common stock was equal to $5.05 per share on the 368,977 shares outstanding, compared with $4.52 per share for 1928.

C. H. Morse, chairman of the board, in his statement to stockholders said in part:

"The net billings to customers for the twelve months amounted to $31,504,908, compared with $30,542,420 for 1928, an increase for the year of $962,488. The total orders received during the same period aggregated $33,022,543, compared with $31,984,904 in 1928.

"Results from research and engineering development, purposed to better adapt our products to field needs, that has been continuously carried on as a definite policy, have been both profitable and gratifying. During 1930, this development program will be enlarged and extended over all product lines, especially the diesel engines, where the progress of the art is rapidly advancing and sales opportunities broadening. Equipment for the pumping of water and the disposal of sewage will also have extra attention.

"Pursuant to the terms of the sinking fund, the company during the year retired 709 shares of preferred stock, reducing the amount of the outstanding stock accordingly. Attention is drawn to the Fairbanks-Morse Pension Fund, the accumulated funds of which, on December 31, 1929, amounted to $2,128,659. These funds are under the control of eight trustees, and are invested in high grade securities entirely apart from the business of the company."

The consolidated income and surplus account as of December 31, 1929, follows:

	1929	1928
Net sales	$31,504,908	$30,542,420
Less: Manufacturing, selling and administrative expenses	27,513,223	26,722,998
Operating profit	$3,991,685	$3,819,422
Deduct:		
Depreciation of buildings and equipment	867,916	857,778
Interest on debentures	377,333	393,334
Contributions to the pension fund	168,205	154,955
Federal income tax	337,616	289,174
	$2,240,615	$2,124,181
Add: Other income	400,470	.....
	$2,641,085	$2,124,181
Net profit of Municipal Acceptance Corporation	107,586	37,490
	$2,748,671	$2,161,671
Less: Amount appropriated for development	400,000	.....
	$2,348,671	$2,161,671
Surplus and undivided profits at December 31, 1928, per last report:		
FairBanks, Morse & Co.	10,421,652	10,848,416
Subsidiary companies	2,972,283	2,081,473
	$15,742,606	$15,091,560
Deduct:		
Premium paid on preferred stock retired	6,365	7,165
Adjustments pertaining to prior years	121,261	91,306
	$15,614,980	$14,993,089
Dividends for the year:		
On 7 per cent preferred stock	485,404	492,541
On common stock	1,106,613	1,106,613
	$14,022,963	$13,393,935
Less:		
Surplus appropriated for redemption of preferred stock	486,500	.....
Unappropriated surplus and undivided profits, December 31, 1929	$13,536,463	$13,393,935

Westinghouse Electric & Manufacturing Company

Net income of $27,062,611 was reported by the Westinghouse Electric & Manufacturing Company for the year ended December 31, 1929. This figure is in excess of net income for any year since 1924 and compares with a figure of $20,814,940 for the full year ending December 31, 1928, and with $15,639,172 for the fiscal year ending March 31, 1928, the last full year before the company's fiscal year was changed to conform to the calendar year.

Gross sales during 1929 amounted to $216,364,588, as against sales of $189,050,302 for the calendar year 1928. Operating expenses during the year totaled $194,371,987, leaving a manufacturing profit of $21,992,601. Other income amounted to $5,323,743 while interest charges totaled only $253,733, or less than one-fourth the interest paid during 1928.

Dividends on preferred stock amounted

to $339,889 and on common stock to $10,987,778, leaving a surplus for the year of $15,734,943. This, with adjustments, brought the total surplus as of December 31, 1929, to $96,818,935. During the year the annual dividend on both classes of stock was raised from $4 to $5 per share.

The report states that unfilled orders on January 1, 1930, totaled $62,225,399, approximately $15,000,000 in excess of the value of unfilled orders at the beginning of the fiscal year. Sales billed and orders booked during the year both exceeded any previous year in the company's history.

The consolidated income and surplus account for 1929 is as follows:

Gross Earnings:		
Sales billed		$216,364,588
Cost of Sales:		
Manufacturing cost, including depreciation of property and plant; all distribution, administration and general expenses; and provisions for taxes and reserves		194,371,987
Net manufacturing profit		$21,992,601
Other Income:		
Interest, Discount and Miscellaneous Income	$2,918,221	
Dividends and Interest on Investments	2,405,521	5,323,743
Gross Income from all Sources		$27,316,344
Deductions from Income:		
Interest Charges		253,733
Net Income for the Year.		$27,062,611
Dividends:		
On Preferred Stock	$339,889	
On Common Stock	10,987,778	11,327,667
Surplus for the Year		$15,734,944
Surplus December 31, 1928		67,089,244
Gross Surplus		$82,824,188
Adjustments:		
Premium on common stock issued in connection with redemption of outstanding bonded indebtedness; less expenses of bond retirement and new stock issues		13,994,747
Surplus, December 31, 1929, per Balance Sheet		$96,818,935

Ryan Car Company

The annual report as of December 31, 1929, shows a profit of $11,463 as compared with a loss of $17,715 for the previous year. Gross sales amounted to $1,844,628, as compared with $1,640,225 in 1928. Assets amounted to $4,027,317 as compared with $3,291,707 in 1928. The operating statement follows:

	1929	1928
Gross sales for the year	$1,844,628	$1,640,225
Cost of manufacturing, selling and administrative expenses (excluding depreciation)	1,759,304	1,595,137
Profit or loss before depreciation	†$ 85,324	†$ 45,088
Depreciation charged off	77,855	70,569
	†$ 7,469	*$ 25,481
Add net of miscellaneous debit and credit items	3,994	7,766
Profit or loss for year	†$ 11,463	*$ 17,715

* Loss. † Profit.

The statement of President W. M. Ryan to stockholders, in part, follows:

Freight car buying began to pick up decidedly during the latter part of the year and, while it came too late to reflect itself in the 1929 results, we have on our books early in 1930 contracts for the construction of 800 new freight cars. The import of this will be appreciated when it is pointed out that our total car business in 1929 amounted to only 700 cars and enabled us to go through the year with an insignificant loss in that department, after charging liberal depreciation.

The road machinery business showed a 50 per cent increase over the previous year, bringing the volume up to a point where your management has felt justified in making a separate corporate set-up, for the purpose of letting it stand on its own feet henceforth. The business will hereafter be done entirely by your subsidiary, the Ryan Manufacturing Corporation. Some additional capital investment was made in the development of new models of machines and in perfecting and enlarging sales representation in the United States and Western Canada. The operation showed a small but promising profit for the year and the prospects are good for a year of heavy buying in the road machinery line.

Our steam passenger car, the Locomotor, has undergone considerable refinement, pointed out by its experience in actual railroad operation, and we have reached a stage where we must make some arrangement for manufacturing the power plant in quantities. The freight car and road machinery shop facilities are not suitable for manufacturing large numbers of these transportation plants and negotiations are under way to secure a proper connection for handling this end of the work. Meanwhile, two more of these units are nearly completed in our own shop, making four in all.

To provide the additional capital to carry on our broadened activities, $588,525 worth of common stock was sold during the year, bringing the total number of common stock outstanding to 127,082.

Obituary

Frank DeVaulle Fenn, who previous to 1919, was general manager of the railroad sales department of the Crane Company, Chicago, died at his home in Chillicothe, Ill., on March 3. Mr. Fenn was born on November 11, 1866, at Marcellus, Mich., and received his education in the Kansas State Normal School at Emporia, Kan. He entered the service of the Atchison, Topeka & Santa Fe at the age of 19 and assisted in the building of the line from Kiowa, Kan., to Amarillo, Tex. He subsequently served for eight years as locomotive fireman and engineman. Mr. Fenn entered the employ of the Crane

Frank DeVaulle Fenn

Company in April, 1893, as traveling engineer, railroad airbrake department; he represented the firm and was also in charge of its exhibits at the Columbian exposition in Chicago in 1893 and at the St. Louis exposition in 1904. He subsequently was appointed general manager of the railroad sales department and retired from active service on account of ill health in June, 1919. Mr. Fenn was one of the organizers of the Railway Equipment Manufacturers' Association which is associated with the Traveling Engineers' Association and was for 27 years an active member of both organizations.

Construction

BUFFALO, ROCHESTER & PITTSBURGH.—The New York Public Service Commission has affirmed its order directing the elimination of the West Main street crossing in Leroy, N. Y.

CANADIAN NATIONAL.—A contract has been let to the Carter-Halls-Aldinger Company, Winnipeg, Man., for the construction of a four-story brick addition to the warehouse in the East yard at Winnipeg.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—A contract for the construction of a one-story addition to the forge and blacksmith shop at West Milwaukee, Wis., has been awarded to Lupinski, Inc., Milwaukee, Wis. With other improvements this will involve an expenditure of about $50,000.

CHICAGO, ROCK ISLAND & PACIFIC.—A contract for the construction of Section 5, 12 miles, of the joint line with the Chicago, Milwaukee, St. Paul & Pacific into Kansas City, Mo., between Polo, Mo., and Birmingham, has been awarded to John Marsch, Inc., Chicago. Separate bids will be closed on April 1 for the construction of Section 4 of this joint line, 7 miles, and for the construction of a bridge.

DELAWARE, LACKAWANNA & WESTERN.—This company has awarded a contract to J. F. Paddleford, Sherburne, N. Y., for work required in connection with the elimination of Baldwins and Baldwins Creamery crossings at Earlville, N. Y. The work involves approximately 40,000 cu. yd. of excavation and the placing of 1,200 cu. yd. of concrete.

ERIE.—A contract for the construction of a bridge at Lanesboro, Pa., has been awarded to the James McCormick Company, Easton, Pa. The Public Service Commission of New York has affirmed its original order directing the elimination of the Athol Springs-Hamburg highway crossing south of Hamburg, N. Y.

GREAT NORTHERN.—A contract has been let to the Railway Engineering Equipment Company, Chicago, for the construction of a direct steaming system for the utilization of lignite as fuel in its engine house at Minot, N. D. A contract for the installation of boiler washing facilities and a direct steaming system to serve an addition to the engine house now under construction at Great Falls, Mont., has been awarded to the Miller Heating Company, Chicago.

KENTUCKY & INDIANA TERMINAL.—This company and the City of Louisville, Ky., have reached a tentative agreement for the elevation of the railroad's tracks on Thirty-first street between Michigan drive and a point south of Broadway in Louisville by the construction of an earth fill. The tentative agreement, which brings to a conclusion two years of negotiation, provides that 35 per cent of the total cost of the project, which is estimated at $700,000, will be borne by the railroad

and 65 per cent by the city. The elevation will accommodate two tracks and a future third track.

NEW YORK CENTRAL.—The low bid of $65,541 submitted by H. R. Beebe, Inc., of Utica, N. Y., for the work in connection with the elimination of the Poland-Trenton state highway crossing of this company's tracks in Poland, N. Y., has been approved by the Public Service Commission of New York and the railroad has been directed to award the necessary contract.

NEW YORK CENTRAL.—A contract for the dismantling of bridge H19 carrying East 144th street, New York City, over this company's tracks and for the construction of a new bridge on the same site has been awarded to Senior & Palmer, Inc., New York. The Public Service Commission of New York has approved detailed plans and estimates of cost totaling $140,500, exclusive of land and damages, for the elimination of Clark Street crossing, Aurelius, N. Y., and of $124,800 for the elimination of the Carterville crossing, Pittsford. The commission has also directed the elimination of the Norton and Temperance House No. 2 crossings northwest of Cazenovia, N. Y., by carrying the highway over the tracks about 560 ft. north of the present Norton crossing at an estimated cost of $163,000.

NEW YORK, NEW HAVEN & HARTFORD.—The most important of a number of projects recently authorized by this company is the installation of automatic signals from Air Line Junction, Conn., to Waterford, at an estimated cost of $357,000. The company has also authorized certain improvements in its Union street freight yard at Bridgeport, Conn., at a probable cost of $66,000; a grade separation project at French's crossing, Plainfield, Conn., to cost about $44,000; and the construction of passing sidings at Norwich, Conn., and at North Webster, Mass., at approximate costs of $92,000 and $45,000, respectively.

ST. LOUIS SOUTHWESTERN.—A contract for the replacement of the draw span over the Ouachita river near Camden, Ark., at a cost of about $100,000, has been awarded to the Kansas City Bridge Company, Kansas City, Mo.

SOUTHERN (Cincinnati, New Orleans & Texas Pacific).—A contract for the construction of a 300-ton concrete electrically-operated coaling station at Somerset, Ky., has been awarded to Fairbanks, Morse & Co., Chicago.

WABASH.—A contract for the construction of a 1,000,000-bu. addition to the grain elevator at Kansas City, Mo., operated by the Uhlmann Grain Company, has been let to the James Stewart Corporation, Chicago.

THE SOUTHERN PACIFIC has arranged a taxicab service in San Francisco, Cal., Oakland and Los Angeles whereby passengers may buy tickets calling for taxicab service from their homes to the station and from the train to any point at the end of the journey.

Railway Finance

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $4,260,000 of 4½ per cent equipment trust certificates, to be sold to the International Manhattan Company, Inc., and Salomon Brother & Hutzler, the highest bidders, at 97.32.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to conditionally issue $45,186,000 of first mortgage bonds to be pledged as security for ten-year notes in like amount to be issued to the Chicago & North Western for advances.

CHICAGO, ROCK ISLAND & GULF.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $5,691,000 of extension first mortgage 5 per cent 30-year bonds to be delivered at par to the Chicago, Rock Island & Pacific in repayment of advances.

COLORADO & SOUTHERN.—*Acquisition.*—The Interstate Commerce Commission has authorized this company to acquire and operate the Colorado Railroad, a subsidiary of which it owns all the capital stock.

HOCKING VALLEY.—*Annual Report.*—The annual report of this company for 1929 shows net income after interest and other charges of $5,189,901, as compared with net income of $4,641,471 in 1928. Selected items from the income statement follow:

	1929	1928	Increase or Decrease
Average mileage operated	349	349	.....
RAILWAY OPERATING REVENUES	$20,888,860	$20,801,232	+$87,628
Maintenance of way	2,506,365	2,306,644	+199,721
Maintenance of equipment	3,848,878	3,844,061	+ 4,817
Transportation	5,509,793	5,784,419	—274,627
TOTAL OPERATING EXPENSES	12,602,729	12,677,629	— 74,900
Operating ratio, per cent	60.3	60.9	— .6
NET REVENUE FROM OPERATIONS	8,286,130	8,123,603	+162,528
Railway tax accruals	1,492,133	1,525,779	— 33,646
Railway operating income	6,793,262	6,596,233	+197,029
Equipment rents, net	818,637	1,032,862	—214.25
Joint facility rents, net	60,815	61,374	— 559
NET RAILWAY OPERATING INCOME	6,035,440	5,624,746	+410,694
Non-operating income	325,902	218,988	+106,914
GROSS INCOME	6,361,342	5,843,734	+517,608
TOTAL DEDUCTIONS FROM GROSS INCOME	1,171,442	1,202,263	— 30,822
NET INCOME	5,189,901	4,641,471	+548,430

MISSOURI PACIFIC.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $25,000,000 of first and refunding mortgage 50-year 5 per cent bonds, to be sold to Kuhn, Loeb & Co., at 97.75. The proceeds are to be used to reimburse the treasury and to purchase equipment to the amount of $9,563,718.

MISSOURI PACIFIC.—*Bonds.*—Kuhn, Loeb & Co. are offering at 100¼ an issue of $25,000,000 of the first and refunding 5 per cent, series H, mortgage bonds of this company, due in 1980. The issue is redeemable at 105 from 1935 to 1975 and thereafter at par plus ½ per cent for each six months between date of redemption and maturity. The issue is subject to the approval of the Interstate Commerce Commission.

NEW YORK CENTRAL.—*Acquires Half Interest in Water Transfer Line.*—The Interstate Commerce Commission has authorized this company to acquire joint control with the Canadian Pacific of the Canadian Pacific Car & Passenger Transfer Co., by purchase of one-half the capital stock of the latter company. The water line operates a car ferry between Prescott, Ont., and Ogdensburg, N. Y.

NEW YORK CENTRAL.—*Control of Federal Valley.*—The Interstate Commerce Commission has authorized this company to acquire control of the Federal Valley by purchase of the entire capital stock at the arbitrated price of $150,000.

PENNSYLVANIA.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue and sell $60,000,000 of 40-year 4½ per cent debenture bonds. The bonds have been sold, subject to the commission's approval, to Kuhn, Loch & Co., at 92.

PENNSYLVANIA.—*Lease of W. J. & S. S.*—This company has filed with the Interstate Commerce Commission its application for authority to lease the railroad, property and franchises of the West Jersey & Seashore, 340 miles, for 999 years, as authorized by the board of directors on January 22. The application points out that the Pennsylvania and affiliated companies on March 7 owned 72.98 per cent of the outstanding common stock of the W. J. & S. S., and 47.12 per cent of the special guaranteed stock. The lease provides for the payment of a rental equivalent to 6 per cent on the stock plus provision for fixed charges, taxes, etc.

PERE MARQUETTE.—*Bonds.*—J. P. Morgan & Co., the First National Bank, the Guaranty Company, the National City Company, J. & W. Seligman & Co., and the Chase Securities Corporation are offering, with the approval of the Interstate Commerce Commission, $14,000,000 of this company's first mortgage 4½ per cent, series C, bonds due in 1980. The issue is redeemable at 105 to 1975 and

(Continued on page 711)

Annual Report

Thirty-Sixth Annual Report of the Southern Railway Company

RICHMOND, VA., March 13, 1930.

To the Stockholders of
SOUTHERN RAILWAY COMPANY:

The Board of Directors submits the following report of the affairs of the Company for the year ended December 31, 1929:

The Year's Business:

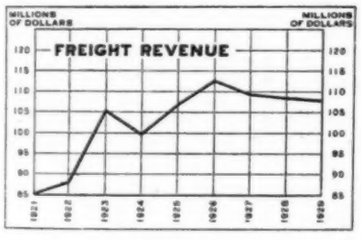
The balance of income after the payment of fixed charges and the preferred stock dividend was equivalent to $11.65 per share on the common stock, comparable with $12.53 per share in the preceding year. Dividends of 5% on the preferred stock and 8% on the common stock were paid in quarterly installments, these being the same rates as were paid in the preceding year. The balance of income after payment of these dividends was $4,743,188, comparable with a balance of $5,881,533 in 1928.

The total revenue from the operation of the railroad was $143,183,948, a decrease of $932,504 from the preceding year. For the first nine months traffic returns were maintained at about the same rate as those of 1928, and, by reason of the receipt of $1,614,000 in payment of mail earnings of previous years, the gross revenue for that period was $1,131,654 above that of 1928, but in October the traffic stream began to fall and continued at a low level during the remainder of the year.

The freight traffic statistics for the full year do not vary greatly from those of the preceding year, as will be seen from the following comparison:

	1929	1928
Freight moved (tons)	44,546,151	45,807,934
Average distance moved (miles)	187.46	183.65
Ton miles	8,350,518,070	8,412,608,256
Average revenue per ton mile	1.293c	1.291c
Total freight revenue	$107,962,042	$108,640,634

The accompanying chart illustrates the fluctuations in the volume of freight traffic on the Southern during the past decade. For the last three years the line has flattened out following the drop from the peak reached in 1926.

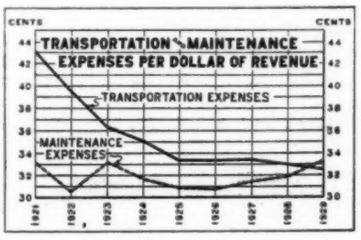


Any comment regarding the passenger business is necessarily monotonous repetition: a progressive recession in local or short distance travel by train accompanying the increasing operation of automobiles on the highways; the lack of success attending all efforts made to recapture that business; the continuation of the program of retrenchment in local passenger train operating expense, and, on the other hand, the profitable operation of through trains for long distance travel.

The statistics:

	1929	1928
Number of passengers	6,367,720	7,051,100
Average journey (miles)	104.08	101.33
Passenger miles	662,764,876	714,476,824
Average revenue per passenger mile	3.320c	3.361c
Total passenger revenue	$22,004,662	$24,016,843

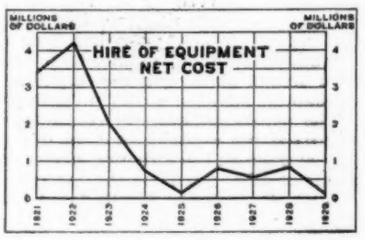
For the first time in the Company's history the charges for maintenance of the property exceeded the cost of conducting transportation. The decline in the transportation expense ratio to the lowest figure reached on the Southern since 1916 coincided with unusual expenditures for the repair of flood damage and other heavy charges to the maintenance account dictated by the policy of writing off during the year obsolescent freight cars and rail.



The expenditures out of each dollar of gross revenue for the several general heads of operating expenses in 1929, compared with 1928, were as follows:

	1929	1928
Transportation of the traffic	32.57c	33.01c
Maintaining roadbed and structures	14.80c	14.61c
Maintaining rolling stock	18.53c	17.26c
Traffic solicitation and supervision	2.03c	2.16c
General expenses	3.19c	3.01c
Operating dining cars and other incidental services	.61c	.65c
Totals	71.73c	70.70c
of which wages required	58.69%	58.90%

Comparative success attended the sustained effort to reduce the net cost to the Company for hire of equipment. The bill on that account for the year was $107,159, a decrease of $725,828, or 87%, under the preceding year.



The tax bill for the year was $9,320,686, a decrease of $258,427 under 1928. Unhappily, this decline does not represent any lightening of the burden of property taxes assessed by states, counties and municipalities: it reflects a reduction in the amount of Federal income tax paid by reason of a smaller taxable income and a further reduction in that tax rate.

The Balance Sheet.

The net increase in capital investment in physical property was $6,993,455, including the cost of 2,500 new freight train cars which have been delivered since the turn of the year.

There was no increase in capital liabilities. On the contrary, the $5,250,000 principal amount South Carolina and Georgia Railroad Company 5½% bonds, which fell due on May 1, 1929, were acquired by the Southern out of treasury funds and are held available for future financing. This transaction accounts for the decline in current cash assets apparent on the balance sheet. As the Southern had been paying the interest on these bonds as rental for a leased line, the acquisition of the bonds resulted in a decrease of $288,750 in the annual charge for interest and rentals.

It is worth while to invite attention to the inventory item in the balance sheet. That now stands at $6,819,382, the lowest figure in thirteen years. This contrasts with the top figure of $17,635,896 on December 31, 1920. The opportunity to accomplish this liquidation of over $10,000,000 of frozen assets is partly in the promptness with which manufacturers now fill orders, partly in expeditious railroad transportation service, but mostly in closer supervision by those on the railroad charged with the distribution and use of serviceable materials and the disposition of obsolete items and scrap.

Additions to the Property.

Important items of the 1929 improvement program were the purchase of 2500 new freight cars and twelve steel mail cars; the construction of new freight depots at Morganton and Shelby, N. C.; the enlargement of the freight depot at Burlington, N. C.; the expansion of yard facilities at Winston-Salem, N. C., and Huntingburg, Ind.; the provision of locomotive fuel handling plants at Asheville, Charlotte, East Durham, Melrose and Ridgecrest, N. C., at Keysville and Strasburg, Va., at Atlanta and Toccoa, Ga., and at Paint Rock, Ala.; the elimination of twenty-one highway grade crossings by the construction of viaducts and underpasses, and the laying of 147 miles of new 100-lb. rail and 64 miles of new 130-lb. rail to replace rail of lighter weight in the main lines.

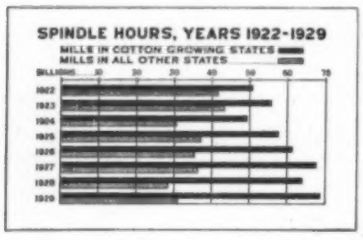
Industrial and Agricultural Development.

The manufacturing capacity of the territory served by Southern Railway System was expanded during the year by the erection of 151 new factories and the enlargement of 91 existing plants, representing an investment of more than one

[ADVERTISEMENT]

hundred million dollars and giving employment to twenty thousand additional wage earners.

The Southern migration of the cotton textile industry continues. Notwithstanding the relatively unfavorable conditions existing in the cotton textile industry during the year, mill activity in the cotton growing states, measured by spindle hours, established a high record and in doing so consumed three times as many bales of cotton as did the mills in other sections of the United States.



The rayon industry in the South continues to grow. The two plants established in our territory in 1928 began operations during the past year, and another plant is preparing to double its capacity during the coming year.

Increased consumption of tobacco products has been followed by the enlargement of tobacco manufacturing plants in several communities served by the Southern.

Paper manufacturing promises to become a major industry in the South. A new plant has been completed and will begin operations this year; another large plant is planning the erection of a second factory in the territory, and a third is making a substantial addition to its present plant capacity.

The petroleum industry continues to grow, the year having witnessed the establishment on our rails at tidewater of four new storage and distribution plants, and of seven track storage plants at other points on the System.

Agriculture in the South fared better in 1929 than in 1928. The latest valuation placed by the United States Department of Agriculture on the total value of 1929 farm crops in the states of the South served by Southern Railway System is five per cent. in excess of its valuation of the 1928 crops. The 1929 cotton crop exceeded that for 1928 by 1,217,000 bales, and tobacco production was 113,156,000 lbs. in excess of the previous year's crop. Southern farm income from live stock products has been increasing steadily year after year. The South's dairy industry continues to expand, the movement of live and dressed poultry and eggs constantly increasing. Of particular importance to the Florida fruit industry is the indication that the risk of the Mediterranean fruit fly has passed.

The attention of the stockholders again is invited to the two statements setting forth simply and untechnically the important statistics concerning the year's business and the Company's financial condition.

To all officers and employees who have faithfully and efficiently performed their duties during the past year the thanks of the Board of Directors again are tendered.

Respectfully submitted, by order of the Board,

FAIRFAX HARRISON,
President.

Financial Results for the Year

	In 1929	In 1928
The Company received from freight, passenger and miscellaneous operations a total revenue of	$143,183,948	$144,116,452
The cost of maintaining the property and of operating the railroad was	102,701,588	101,887,718
Leaving a balance from railroad operations of	$40,482,360	$42,228,734
Federal, state and local taxes, (plus a small amount of uncollectible items) required	9,349,243	9,598,380
Leaving a balance of	$31,133,117	$32,630,354
The Company paid to other companies for hire of equipment and use of joint facilities in excess of the amount received by it from those sources	1,102,140	1,787,799
This leaves an income from railway operations of	$30,030,977	$30,842,555
Other income derived from investments in stocks and bonds and miscellaneous items was	5,785,191	6,382,900
Making a total income of	$35,816,168	$37,225,455
Interest on funded debt and equipment trust obligations, rents paid for leased railroads, and other miscellaneous deductions totaled	17,687,380	17,958,322

Financial Results for the Year (Continued)

	In 1929	In 1928
There then remained a balance available for dividends, working capital and other corporate purposes of	$18,128,788	$19,267,133
The regular dividends on the 5% Preferred stock were	3,000,000	3,000,000
This left a balance of	$15,128,788	$16,267,133
The earnings per share of common stock were equivalent to	$11.65	$12.53
The dividend per share paid on the common stock was	$8.00	$8.00

Financial Position at the End of the Year

	On December 31, 1929	On December 31, 1928	Increase or *Decrease*
The Company had investments in land, railroad tracks, terminal facilities, shops, locomotives, freight and passenger cars and other fixed property of	$555,581,133	$548,917,014	$6,664,119
Cash derived from subscriptions to additional common stock set aside as a construction fund	845,699	1,662,030	*816,331*
In addition the Company had investments in stocks, bonds and notes of affiliated companies carried at	76,088,530	68,627,392	7,461,138
Total Investments	$632,515,362	$619,206,436	$13,308,926
The Company had cash working capital	$14,606,022	$18,257,797	*$3,651,775*
Cash reserve invested in U. S. Government and other marketable securities	24,569,627	25,215,981	*646,354*
Other railroad companies and others owed the Company	8,022,862	8,020,131	2,731
The Company had on hand fuel, rails, ties, bridge material and other supplies necessary for keeping road and equipment in good repair	6,819,382	8,251,533	*1,432,151*
Insurance Fund Reserve, other deferred assets and unadjusted debits, including items owed but not yet available to the Company	6,675,653	7,302,241	*626,588*
The Assets of the Company totaled	$693,208,908	$686,254,119	$6,954,789
The Company owed for materials, supplies, wages and balances to other railroad companies, and interest and rents accrued but not yet due	$21,613,256	$21,370,679	$242,577
Taxes accrued but not due	2,680,151	3,474,240	*794,089*
Operating and insurance reserves	3,809,995	3,977,965	*167,970*
Reserve for depreciation of equipment	37,240,662	34,543,117	2,697,545
Reserve for dividends on preferred and common stocks	5,596,400	5,596,400	
Deferred liabilities, including items due to others not yet adjusted	8,222,149	7,866,091	356,058
The total of these liabilities, credits and reserves was	$79,162,613	$76,828,492	$2,334,121
After deducting these items from the total assets there remained available for the capitalization of the Company net assets of	$614,046,295	$609,425,627	$4,620,668
The capitalization of the Company consisted of the following:			
Funded Debt, including bonds and equipment trust obligations	$304,470,895	$304,560,746	*$89,851*
Preferred Stock, par value	60,000,000	60,000,000	
Common Stock, par value	129,820,000	129,820,000	
Making a total capitalization of	$494,290,895	$494,380,746	*$89,851*
After deducting this capitalization from net assets there remained a surplus of (This surplus has, in large measure, been reinvested in the property).	$119,755,400	$115,044,881	$4,710,519

[Advertisement]

Financial News

(*Continued from page 708*)

thereafter at par. The offering price is 97 which will make the yield 4.65 per cent.

Bond Issue Authorized.—The Interstate Commerce Commission has authorized this company to issue $14,000,000 of first mortgage 4½ per cent bonds, series C, due in 1980. The issue is authorized for sale to J. P. Morgan & Co., at 94½, making the annual cost to the railroad approximately 4.791 per cent.

PITTSBURGH & WEST VIRGINIA.—*Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,500,000 of 5½ per cent promissory notes in renewal of collateral notes maturing January 30.

READING.—*Philadelphia Bodies Ask Modification of Consolidation Plan.*—Thirteen trade organizations of Philadelphia have filed with the Interstate Commerce Commission a petition for a re-opening of the proceedings in connection with its consolidation plan and a modification of the plan to make the Reading and Central of New Jersey the basis of an independent system. The plan allocates them to a Baltimore & Ohio system.

ST. LOUIS-SAN FRANCISCO.—*Equipment Trust Certificates.*—The Interstate Commerce Commission has authorized an issue of $8,085,000 of equipment trust certificates, to be sold at not less than 98.034.

VIRGINIAN.—*Bonds.*—Subject to the approval of the Interstate Commerce Commission, the National City Company, Lee, Higginson & Co., and Kissel, Kinnicutt & Co. are offering $5,000,000 of 4½ per cent first mortgage bonds of this company, due in 1962. The issue is redeemable at 102½ and is offered at 97, to yield approximately 4.68 per cent.

WABASH.—*Bonds.*—Kuhn, Loeb & Co., are offering $15,000,000 of 5 per cent refunding and general mortgage series D bonds of this company due 1980. The issue is redeemable from 1940 to 1975 at 105 and thereafter at par plus ½ per cent for each six months from redemption date to maturity. The issue is priced at 100½.

Average Prices of Stocks and of Bonds

	Mar. 18	Last week	Last year
Average price of 20 representative railway stocks.	135.50	133.84	132.95
Average price of 20 representative railway bonds..	94.43	93.27	90.43

Dividends Declared

Baltimore & Ohio.—Preferred, 1 per cent, quarterly; Common, 1¼ per cent, quarterly, both payable June 2 to holders of record April 19.

Mahoning Coal R. R.—Common, $12.50, quarterly, payable May 1 to holders of record April 16.

New York Central.—2 per cent, quarterly, payable May 1 to holders of record March 28.

Pittsburgh & West Virginia.—1¼ per cent. quarterly, payable April 30 to holders of record April 15.

Southern.—Common, 2 per cent, quarterly, payable May 1 to holders of record April 1; Preferred, 1¾ per cent, quarterly, payable April 15 to holders of record March 24.

Wabash.—Preferred A, $1.75, quarterly, payable May 24 to holders of record April 19.

Railway Officers

New President for National of Mexico

Javier Sanchez Mejorada, Minister of Communications of the Republic of Mexico and a member of the board of directors of the National Railways of Mexico, has been appointed executive president of those railways, with headquarters at Mexico City. With a commendable record as a member of several international commissions, Mr. Sanchez Mejorada was called upon during the administration of President Calles to assist in the reorganization of the National Railways. One of his first public services was as a member of the International Water Commission to decide the distribution of the waters of the Rio Grande and Colorado rivers as between the United States and Mexico. This work attracted

Javier Sanchez Mejorada

the attention of President Calles who appointed him a member of the National Irrigation Commission which was created to carry out the construction of irrigation works to open new fields of agricultural development. The El Mante and Don Martin irrigation dams were built under his supervision.

This irrigation work is considered to be largely responsible for his selection for the Communications portfolio in the Portes Gil cabinet in 1928. During his entire service as a public officer, Mr. Sanchez Mejorada has followed his original determination to remain aloof from politics. When Ortiz Rubio was recently made president of the republic, Mr. Sanchez Mejorada was asked to continue as the head of the Communications department but Plutarco Calles, to whom had been entrusted the reorganization of the National Railways, insisted upon having him as his aide and at a recent meeting of the board of directors of the National Railways, Mr. Sanchez Mejorada was selected as president. Both men are faced with a difficult task because of the indebtedness of the railways and the troubled financial situation in the country.

Mr. Sanchez Mejorada was born at Pachuca, State of Hidalgo, in 1886 and obtained his high school education at the Scientific Literary Institute of Hidalgo and his college training in civil engineering at the Engineering College of Mexico City. After graduation from college his first engineering experience was obtained with the Real Del Monte Mining Company on the construction of ore mills at Guerrero, State of San Luis Potosi. Later he served for a few years as assistant engineering superintendent of that company on the construction of a railway linking Escobar Cabrera and Guerrero and on the construction of the El Rey water works in Coahuila. He was then appointed chief engineer of the River Mazas Waters Commission at Torreon, State of Coahuila, and while in that district he supervised the construction of the electric tramways between Lerdo and Torreon and several irrigation works. Afterward he served successively on government projects as technical advisor on railroads for the Department of Communications, head of the Irrigation Development Bureau of the Agricultural Development Department, engineer in charge of the locating of the railway between San Carlos and Reunion in Hidalgo, an aide in the construction of the Tepexic power plant at Necaxa, Puebla, chief of the first irrigation zone in Lower California, a member of the International Waters Commission and a member of the National Irrigation Commission. This latter appointment was followed by his selection as Minister of Communications, a position he held until his further appointment of executive president of the National Railways of Mexico.

Operating

B. E. Myers, assistant trainmaster on the New York zone of the Pennsylvania, has been transferred to the Pittsburgh division.

E. E. Stoup, terminal superintendent of the Chicago Great Western at Oelwein, Iowa, has been appointed assistant superintendent of the newly created Minnesota division, with headquarters at Clarion, Iowa.

J. B. Fisher, general superintendent of transportation of the Central region of the Pennsylvania, has been appointed assistant to the general manager of that region, with headquarters as before at Pittsburgh, Pa.

K. P. Chinn, assistant general storekeeper of the Southern Pacific Lines in Texas and Louisiana, with headquarters at Houston, Tex., has been appointed trainmaster of the Beaumont division, with headquarters at Jacksonville, Tex.,

succeeding **J. D. Kinsler,** who has been transferred to the Dallas division, with headquarters at Hearne, Tex. **E. D. Butler,** trainmaster of the Victoria division, with headquarters at Victoria, Tex., has been transferred to the Houston division, with headquarters at Yoakum, Tex., to succeed **T. C. Montgomery,** who has been transferred to the Victoria division to replace Mr. Butler.

N. B. Walton, general superintendent of the Manitoba district of the Canadian National, has been appointed general superintendent of transportation for the western region, succeeding **V. I. Smart,** who resigned to accept the position of Deputy Minister of Railways and Canals of Canada, as reported in the *Railway Age* of March 15, page 659. **W. R. Devenish,** general superintendent of the Alberta district at Edmonton, Alta., will succeed Mr. Walton as general superintendent of the Manitoba district, and **W. I. Munro,** superintendent of the Portage division, at Winnipeg, Man., has been promoted to general superintendent of the Alberta district. Mr. Walton was born on July 27, 1884, at Palmerston, Ont. He entered railway service in August, 1900, as a clerk on the Grand Trunk (now operated as

N. B. Walton

a part of the Canadian National) and later was promoted successively to telegraph operator, secretary to the vice-president and trainmaster. After spending a year in the service of the Great Northern, Mr. Walton returned to the Grand Trunk in January, 1908, as claim agent at Toronto, Ont. In October of that year, he was promoted to secretary to the general superintendent and he held this position until August, 1910, when he was promoted to trainmaster and assistant to the general superintendent at Winnipeg, Man. Mr. Walton was promoted to superintendent of the Edmonton division in July, 1911. He returned to Winnipeg in 1920 as assistant general superintendent and became general superintendent of the Manitoba district in 1924, which position he now vacates to become general superintendent of transportation for the western region.

Traffic

E. G. Waring has been appointed general agent of the freight and passenger departments of the Missouri Pacific at Oklahoma City, Okla.

The headquarters of **W. R. Cunningham, Jr.,** general agent of the St. Louis Southwestern, have been transferred from El Paso, Tex., to Phoenix, Ariz., and the headquarters of **W. L. Geer,** assistant general agent, have been transferred from Phoenix to El Paso.

R. J. Hanson, division freight agent on the Lehigh Valley at Newark, N. J., has been promoted to general agent at Cleveland, Ohio. **B. B. Harris,** general agent at Detroit, Mich., has been promoted to assistant general freight agent, with headquarters at the same point.

W. H. Ward, general freight agent of the Indiana Harbor Belt, with headquarters at Chicago, has also been appointed general freight agent of the Chicago Junction and the Chicago River & Indiana. **J. L. Carleton,** general agent of the freight department of the New York Central, has been promoted to assistant general freight agent of the Indiana Harbor Belt, the Chicago Junction and the Chicago River & Indiana, with headquarters as before at Chicgao. **G. E. Smith,** secretary to the vice-president of the I. H. B. and the C. R. & I., has been promoted to industrial agent of those roads and the Chicago Junction at Chicago.

Engineering, Maintenance of Way and Signaling

F. J. Hoffman, division engineer of the Western division of the Chicago Great Western at Clarion, Iowa, has been appointed assistant division engineer of the newly created Minnesota division at St. Paul, Minn.

David Davis, Jr., supervisor of track on the Pennsylvania at North Philadelphia, Pa., has been promoted to division engineer of the Elmira division at Elmira, N. Y., succeeding **N. M. Lawrence,** who has been transferred to the Buffalo division at Buffalo, N. Y. Mr. Lawrence succeeds **J. M. Fair,** who has been transferred to the Long Island at Jamaica, N. Y., where he replaces **J. G. Hartley,** who has been appointed assistant engineer in the office of the chief engineer of the Pennsylvania at Philadelphia, Pa.

Mechanical

H. W. Jones, superintendent of motive power of the Western Pennsylvania division of the Pennsylvania, has been appointed general superintendent of motive power of the Central region, succeeding R. H. Flinn, promoted. Mr. Jones was born on December 30, 1884, at Northumberland, Pa. He entered the service of the Pennsylvania as a machinist apprentice in the Sunbury Shops, on July 1, 1903. After holding various positions in the Maintenance of Equipment department, he was appointed assistant master mechanic at Wilmington, Del., in November, 1917, and in December, 1921, he was advanced to the position of master mechanic at the Juniata Shops, Altoona, Pa. On June 16, 1929, Mr. Jones was appointed superintendent of motive power of the Western Pennsylvania division.

Purchases and Stores

P. E. Welch has been appointed district storekeeper on the Southern Pacific Lines in Texas and Louisiana, with headquarters at Algiers, La., succeeding **N. Feigel,** who has been transferred to Houston, Tex. Mr. Feigel succeeds **W. E. Rawson,** who has been promoted to assistant general storekeeper, with headquarters at Houston, Tex.

Obituary

J. H. Stanfiel, assistant to the vice-president in charge of operation of the Southern, died at his home in Washington, D. C., on March 13.

George Notman, former comptroller and secretary of the El Paso & Southwestern (now part of the Southern Pacific), with headquarters at New York, died recently. Mr. Notman retired on January 1, 1925, after 34 years of service.

John G. Taylor, former division superintendent and special engineer of the St. Louis-San Francisco, died at Springfield, Mo., on January 18, at the age of 65 years. Mr. Taylor entered railway service when 14 years old as a water boy at Alton, Ill., and at the time of his retirement he had been connected with the Frisco for more than 40 years. Among the positions he held with that road were those of resident engineer for the system, and for the Central, Southern and Red River divisions, district engineer of the Eastern division, superintendent of the Ozark and Western divisions, division engineer of the Southern and Southwestern divisions and special engineer for the system.

Clifton S. Thompson, retired engineer of bridges and buildings of the Denver & Rio Grande Western, died at his home at Denver, Colo., on March 11. Mr. Thompson was born at Boston, Mass., on January 2, 1853, and entered railway service in 1879 as a rodman on the Denison & Pacific (now part of the Texas & Pacific). He entered the employ of the Rio Grande four years later and served until 1891 as chief clerk and draftsman in the bridge and building department. On the latter date he was promoted to bridge engineer. After two years in other than railway service Mr. Thompson returned to the Rio Grande in 1904 as supervisor of bridges and buildings. He was appointed engineer of bridges and buildings in 1908, and several months before his retirement in 1923 he was given the title of architect.

Railway Age
Motor Transport Section
Devoted to the Co-ordination of Railway and Highway Service
Vol. 88 March 22, 1930 No. 12
Name Registered U. S. Patent Office

Contents

Boston & Maine's Efficient Maintenance Plan ..... **Page 715**

An article in which R. C. Boyden, mechanical superintendent of this railway's highway subsidiary, describes the maintenance system which keeps B. & M. motor coach equipment on high standard of operating efficiency.

Rail-Motor Coach Co-ordination in Great Britain 720

Alfred W. Arthurton of the British Railway Companies' Association outlines marked progress which has been made by British railways in their policy of co-operating with independent highway operators.

Selling More Rides 725

John B. Walker, sales and advertising manager, The Greyhound Lines, tells of his company's passenger traffic merchandising and advertising methods.

EDITORIALS

More About the Division 713
Day by Road, Night by Rail 714
Britain's Road-Rail War Ends 714

GENERAL ARTICLES

Boston & Maine's Efficient Maintenance Plan, by R. C. Boyden 715
Rail-Motor Coach Co-ordination in Great Britain, by Arthur W. Arthurton 720
Northland Adds to Garage Facilities at Minneapolis 724
Selling More Rides, by John B. Walker 725
Why Truck Lines Attract Traffic, by An Industrial Traffic Manager 729
Light-Weight Diesel Engines, by O. D. Treiber 731
Brazing Spring Shackles 733
Worn Cylinder Blocks Relined 733

NEW EQUIPMENT

Passenger and Express Body Built for Mack B K Chassis 734
A.C.F. Announces a Small Capacity Motor Coach 735
International Model A-5 Meets Fast Hauling Requirements 736
Walden-Worcester Hub Cap Wrench 737
South Bend Introduces a Small Shop Lathe .. 737
Stewart Warner Electric Fuel Feed System .. 738
A C Heat-Range Spark Plugs 738

EVERY-DAY PROBLEMS OF MOTOR COACH AND TRUCK OPERATION 739

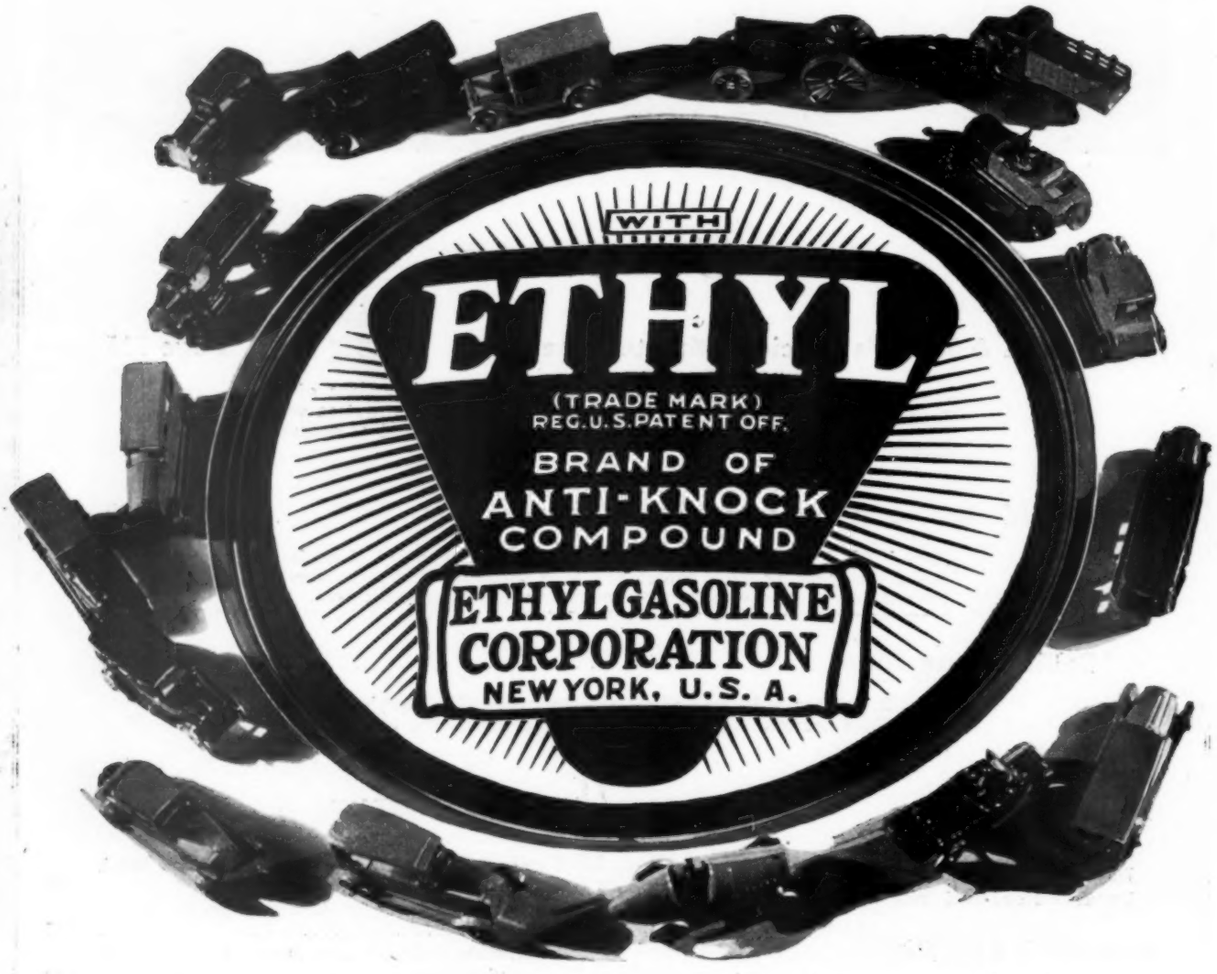
MOTOR TRANSPORT NEWS 741

F. L. Jacobus, Associate Editor
John C. Emery, Motor Transport Editor
Walter J. Taft, Associate Editor

The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.)

Everywhere this emblem means

ETHYL GASOLINE



THE oil companies which supply more than fifty per cent of all the motor fuel used in the United States and Canada are now mixing Ethyl anti-knock fluid with their gasoline to provide a premium fuel that is worth a premium.

Every one of them has agreed to conform to the standard set by the Ethyl Gasoline Corporation. This means that they will use base gasoline of specified quality, and mix with it sufficient Ethyl fluid to "knock out that 'knock'" in cars of average compression, and to develop the additional power of the new high-compression cars.

So wherever you drive — whatever the oil company's name or brand associated with it — *any* pump bearing the Ethyl emblem represents that standard, or better.

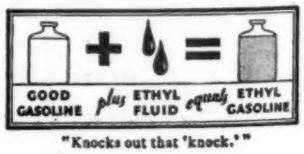
Remember that while Ethyl Gasoline is always colored red for identification, not all red gasolines are Ethyl. Always look for the Ethyl trademark. Ethyl Gasoline Corporation, New York City.

The active ingredient now used in Ethyl fluid is tetraethyl lead

© E.G.C. 1930

TRY ETHYL THIS WEEK END

Week-end driving is hardest of all. So we ask you to try Ethyl then. See how much longer you stay in high; how much better control you have; how much fresher you feel at the end of the trip. Small cars and older cars benefit from Ethyl just as much as larger, more expensive new cars.



"Knocks out that 'knock.'"

Railway Age
Motor Transport Section
Devoted to the Co-ordination of Railway and Highway Service

Vol. 88 *March 22, 1930* *No. 12*

More About the Division

SINCE the publication of the editorial entitled "The Job of the Division" in the *Motor Transport Section* of February 22, a number of comments have been received from railway officers who have had a part in the affairs of the Motor Transport Division. In general, these officers appear to be in accord with our view that the division "has yet some distance to go before it will be organized and functioning on as efficient a basis as it should be in order to do its work properly."

Whether or not all of the railways recognize the fact, it appears to us that they are in such need of an organization like the Motor Transport Division that every effort should be made to direct its work along the most constructive lines.

Enthusiasm Lacking

There is no denying the fact that the Motor Transport Division has failed to arouse much enthusiasm among the railways. It is puzzling why this should be, when motor transportation is steadily erecting a stronger effect upon railway transportation, and when the Motor Transport Division was established by the American Railway Association for the purpose of studying the new problems raised by the development of motor transportation. Regardless of the reason, however, there can be no denying the fact that a lack of enthusiasm exists.

One railway officer wrote: "Statements that you have made under the heading, 'Proper Support Lacking,' cover the situation in a nutshell. Letters were recently sent to about 50 presidents and vice-presidents of railroads seeking to secure nominations for some of our committee vacancies, and out of the whole lot, only one recommendation was received. The balance of the replies indicated that they were not sufficiently interested to name anyone from their organization." This officer believes that the whole subject is worthy of further discussion between officers of the division and officers of the American Railway Association, if the Motor Transport Division is to be kept alive.

Another officer of a leading railway wrote: "I think the statements contained in your editorial under the caption 'The Job of the Division' are eminently sound and very much to the point. The stirring-up you have given to the matter will have a salutary effect and prove of real value to the division. Of course, what transpires at the next session or two of the division will quite likely decide the issue. Attention was directed at the Toronto meeting to the lethargy prevailing."

Still another correspondent went directly to the heart of the matter when he said, "I doubt if the proceedings of previous meetings have gotten any particular attention from the general officers, and their interest, therefore, has not been sufficiently aroused to demand that the individual officers on the railroads, who might be concerned, take the active interest which should be displayed in the division."

The suggestion has also been made that the division needs a well-defined program of activities in which the work of the three sections of the division will be coordinated and in the development of which all regional committees and committee chairmen will work together. It has been suggested that at the various meetings of the division old information has been rehashed entirely too much. That this criticism is sound will hardly be denied by anyone who has attended the meetings of the division.

Definite Program Needed

A well-defined program of activities, such as has been suggested would go a long way towards increasing the interest and constructive nature of the proceedings of the division, and also, by increasing the interest in the proceedings, arouse enthusiasm for the activities of the division on the part of a very much larger number of officers than those who have attended previous meetings of the division.

Fortunately, the officers of the division recognize the gravity of its present situation. It is understood that steps are to be taken very shortly which will lay a direct course of progress for the division and will give assurance of its adhering strictly to that course.

Stronger and better organized committees, a sounder program of activities, and more definite recognition of the work of the division by executive officers of the railways are the prime needs of the division at the present time. These needs are recognized by those in a position to meet them with direct action, and such direct action is expected to take place at once.

Those who have been active in the division from its inception, and have expended much time and energy in its organization, have quite properly been concerned with its failure to make more rapid progress. This is not, however, a time for discouragement. On the contrary, the important work which the division set out to do remains to be done. Under the leadership of the officers of the division, a solution for the present problems of the organization can be found, and it is confidently expected that it will be.

Day by Road, Night by Rail

A NOVEL and interesting experiment will be undertaken by the Pennsylvania when, on April 1, it places in service its road-rail co-ordination with the Greyhound Lines for passengers traveling between the Eastern seaboard and Chicago or St. Louis. Passengers will start their journey from all terminals early in the morning, traveling all day by motor coach; will then entrain for the night; and complete the journey by motor coach the next day. The time of the trip will be eight or ten hours longer than the all-rail journey, and about as much less than by motor coach alone. Moreover, Pullman accommodations on the train will be included in the price of a ticket, thus overcoming the chief objection to highway travel at night.

Observers have noted that long distance motor coach lines have not drawn their patrons primarily from the railroads, but rather that they have developed a clientele which, but for the low rates offered, could not afford to travel at all. The railways have not developed business of this kind to any great extent, since to do so might endanger the rate structure of existing traffic. The long distance motor coach lines, have, therefore, by offering a slower service at lower rates, provided an American equivalent to the second or third class service provided by the railways in Europe. The plan worked out by the Pennsylvania and the Greyhound Lines seems to offer advantages to both the railroad and the highway line. To the former it gives some revenues which it would not enjoy if the traffic were handled entirely by highway, while the motor coach line is enabled to offer a faster and more comfortable service to patrons, which should serve to attract traffic. It is to be noted that the participation of the railroad involves on its part no concession from standard rates.

The venture is new and must be viewed frankly as an experiment until it has had a thorough trial. On the other hand, it seems from every point of view to be mutually profitable not only to the participating carriers but also to that portion of the traveling public to whom an appreciable saving in the cost of travel is more important than the conservation of time. The Pennsylvania, in providing this service, is not only maintaining its position as a leader in the cause of rail and highway co-ordination; it is also undertaking an experiment the results of which may serve as a guide to other railways which are endeavoring to solve the perplexing problems involved in the present passenger traffic situation.

Britain's Road-Rail War Ends

ELSEWHERE in this issue appears an article outlining the progress which has thus far been made by railways of Great Britain in the development of their policy of co-operating with independent motor coach operators. It is but little more than a year and a half ago that these British railways received from Parliament authority to engage in highway passenger transport. Within this short period of 18 months they have so successfully negotiated with existing highway operators that a general understanding has been reached.

The author of the present article, an officer of the British Railway Companies' Association, points out in this introduction that "The main object of the railways in seeking from Parliament powers to operate on the highway, was to put themselves in a position to supply the public with the most efficient and economical service by rail or highway, or partly by one and partly by the other. In their view, if the usefulness of motor transport was to be developed to capacity and the maximum of benefit obtained by the public, the fullest measure of co-operation and co-ordination between road and rail transport should be secured."

That the railways have followed the policy outlined in the foregoing, instead of continuing a transport war, is manifest from the article's outline of developments. Cut-throat competition has been ended. The larger motor transport concerns had strongly opposed the railway bills in Parliament—their fears were soon allayed, however, by the attitude of the railways and thus these highway operators soon recognized the soundness of the railway disposition to co-operate in making rail and highway services complementary.

Several different types of agreement have been entered. Some involve one railway with one or more highway lines; others involve two railways in joint enterprise with motor coach concerns and then there are the co-operative agreements with those municipalities which operate highway services. All of these, outlined in detail in the article, testify to the comprehensiveness of the co-ordinating plan, the thoroughness and celerity of the adoption of which must be credited to industrial leadership of a high order.

Motor Coaches Used in Summer Tours Service of the Boston & Maine Transportation Company

Boston & Maine's Efficient Maintenance Plan

System of maintenance developed keeps equipment up to high standard of operating efficiency and prevents duplication of work in outlying garages

By R. C. Boyden

Mechanical Superintendent, Boston & Maine Transportation Co.

PROPER maintenance methods are essential to successful motor coach operation. Without regular inspection and repairs, motor vehicles rapidly deteriorate and become unequal to the task of fulfilling the present day demand for fast and frequent transportation. The cost of proper maintenance is usually less than the loss caused by the more rapid depreciation, due to the equipment not receiving the attention necessary to keep it running at a high rate of efficiency.

Passengers do not like to ride in vehicles that have annoying squeaks or rattles, or that give evidence of impending breakdown. It also becomes impossible to maintain schedules to the satisfaction of the traveling public with equipment that is subject to delay on the road.

Maintenance Carefully Considered

The Boston & Maine Transportation Company has carefully considered the question of what constitutes proper maintenance for its own equipment, and a system has been developed which has shown satisfactory results in reducing the number of road delays and in keeping the equipment up to a high operating efficiency, even after a large mileage has been covered.

During 1929, our operation consisted of 99 coaches operating over three divisions consisting of 30 routes, with an aggregate mileage of 1200 miles, these routes being scattered throughout northern New England. Seven garages are maintained, two for major overhauls and five equipped for minor repairs only. In addition to this, there are 16 private garages where coaches are housed, at which points no work other than cleaning is done. Due to the scattered nature of the operation, it is necessary to transfer mechanics from their home garages to these outlying points to take care of minor repairs. While this increases the maintenance cost, we have found it to be cheaper than running up the deadhead mileage which would be necessary to bring these coaches into our own garages.

State Requirements

Maintenance is further affected somewhat by the stringent regulations in force in some of the states in which we operate. This is particularly true in the states of Massachusetts and New Hampshire, where representatives of the respective Public Utilities Commissions are continually, without notice, conducting brake tests and other inspections. The following re-

BMT 41 REV. 3-30m-9-29

BOSTON & MAINE TRANSPORTATION CO.

COACH DEFECT CARD

Coach No. 401 Date 1-30-1930

Speedometer Readings			
	Finish	82765	Operator
Coach Gassed at	Start	82705	Parsons
	Miles Run	60	
	Finish		Operator
	Start		
82765	Miles Run		
	Finish		Operator
	Start		
	Miles Run		

Punch Number of Defect to be Remedied

1 NO DEFECTS	Motor Skipping	26
	Clutch	27
2 Brakes-Foot	Transmission	28
3 Brakes-Hand	Oil Pressure	29
4 Damaged Body	Oil Leaks	30
5 Body Squeaks	Oil Guage	31
6 Broken Glass	Radiator	32
7 Doors	Water Leaks	33
8 Steps	Fan	34
9 Window Lifts	Air Pressure	35
10 Seats	Air Leaks	36
11 Signs	Application Valve	37
12 Mirrors	Springs-Front	38
13 Horn	Springs-Rear	39
14 Generator	Air Bottles	40
15 Starter	Axle-Front	41
16 Ignition	Steering	42
17 Ammeter	Wheels	43
18 Switches	Tires	44
19 Fuses	Fenders-Right	45
20 Buzzer	Fenders-Left	46
21 Lights-Inside	Windshield Wiper	47
22 Lights-Marker	Speedometer	48
23 Lights-Tail	Fire Extinguisher	49
24 Lights-Head	Battery	50
25 Engine Knock	Bumper	51

DEFECTS NOT LISTED

Repaired by

(1)

BOSTON & MAINE TRANSPORTATION CO.

DAILY AIR CHART

Bus No. 401 Month January

DATE	FRONT		REAR				SPARE
	Left	Right	R. Outer	R. Inner	L. Outer	L. Inner	
1							
2							
3	70	70	70	70	70	70	70
4							
5							
6	70	70	70	70	70	70	70
7	70	70	72	66	70	70	70
8	75	65	65	60	75	75	75
9	70	70	75	70	75	75	75
10	70	70	75	70	75	70	75
11	70	70	75	70	75	70	75
12	70	70	75	70	75	70	75
13							
14							
15							
16							
17	70	70	70	70	70	70	70
18	70	70	75	70	70	70	70
19							
20	70	76	75	70	70	70	70
21	70	70	70	65	70	70	70
22							
23							
24	70	70	70	65	75	65	70
25							
26							
27							
28	75	70	70	65	60	70	75
29							
30							
31							

Air pressure should be placed in proper column each day Bus is in service.

BMT 55-Bm-12-28

(2)

BMTC 66-3m

Boston & Maine Transportation Co.

MONTHLY GAS AND OIL CONSUMPTION CHART

Bus No. 238

Month November Year 1929

Operators or Mechanics MUST enter on this card ALL Gas or Oil put in Coach on road or in garage.

Day	Gas Gallons	Oil Quarts	Day	Gas Gallons	Oil Quarts	Day	Gas Gallons	Oil Quarts
2	20	1						
3	12	2						
4	33	5						
5	10	4						
5	20	4						
6	10	4						
7	25	2						
8	8	12						
9	11	1						
10	8	2						
12	11							
13	8	7						
14	14	2						
15	10							
15	11	2						
16	10							
16	18	3						
18	21	4						
19	24	5						
20	34	8						
20	6	2						
21	42							
27	22							
27	10	2						
28	14	4						
29	19	5						

Speedometer Reading on last day of this month 11986

Speedometer Reading on last day of preceding month 9229

Total Miles Run 2757

Total Gallons Gas 402

Total Quarts Oil 67

Av. Miles per Gallon Gas 6.86

Av. Miles per Quart Oil 41.15

(3)

Send to E. C. BOYDEN first day of each month

BMT 51 REV. 2-30-2-30

BOSTON & MAINE TRANSPORTATION CO.

2000 MILE INSPECTION

GARAGE Cambridge

Coach No. 121 Date 2-21 1930

Odometer 79860	MECH. NO.
19 Grease and Oil Change	6
20 Drain Air Tank	6
21 Center Drive Shaft Bearing	3
22 Universal Joint Bolts	3
23 Cross Tube—Drag Link	3
24 Front Wheel Bearings	3
25 Steering Gear	3
26 Spring Hold Down Bolts	6
27 Distributor—Coil—Magneto	3
28 Spark Plugs	3
29 Timing and Compressor Chain	3
30 Oil Compressor Chain	6
31 Fan—Oil—Belt	6
32 Vacuum Tank Screen	3
33 Carburetor Screen	3
34 Water Pump	3
35 Clutch Adjustment	3
36 Brake Adjustment	3
37 Battery Hold Downs	6
38 Seats	6
39 Door Hinges and Openers	6
40 Brake Linings (West.)	3
41 Wheel Alignment	3
Remarks	
One seat cushion removed for repairs	
New distributor wires installed	

(4)

Coach No. 121 Garage Cambridge

BMT 25

Oil O K Speedometer: 79860

Water O K Date 2/21/30

Gas O K

Tools: O K
Bar, Jack and Handle, Wheel Wrench, Tape and Crank.

Signed: Nickerson (5) Mech.

SM39-C

1 Defects Are Punched Out Taking Less Time Than Writing.

2 Air Pressure Is Checked Daily.

3 This Form Is Carried in the Coach for One Month.

4 These Forms Are Sent to the Superintendent's Office After the Work Has Been Completed.

5 These Items Are Checked Every Night to Protect the Operator.

6 Daily Inspection Made in the Service Garage by the Night Mechanic.

BMT 36 1200-2-30

BOSTON & MAINE TRANSPORTATION CO.

DAILY INSPECTION

GARAGE Cambridge

Coach No. 121 Date 2/21 1930

Odometer 79860	MECH. NO.
1 Defect Card	3
2 Generator	3
3 Lights—Buzzer	3
4 Windshield Wiper	3
5 Oil Can	6
6 Air Leaks	3
7 Oil and Water Leaks	6
8 Oil in Air Compressor (West.)	6
9 A. C. F. Rear End	
10 Air Bottles	6
11 Battery Filled	6
12 Wheel Nuts	6
13 Tire Pressures Entered	6
14 Cleaned Inside	6
15 " Outside	6
16 Chains (During Season)	6

(6)

Remarks on other side

quirements are necessary in the state of Massachusetts: The service brakes must stop the coach within 45 ft. at 20 miles per hour and the hand brake must stop the coach within 100 ft. Marker lights must be green in front and red in the rear. The stop light must have an amber lens; the driveshaft must be equipped with a guard to prevent its dropping to the ground in case of breakage; the driver's seat must have a protecting guard rail to prevent passengers from crowding or interfering with the operation of the coach; an emergency door must be provided on the left rear side and must be well oiled and never obstructed; a sign reading "Do not talk to the Operator" must be in plain view of the passengers, and a gear shift diagram placed where the operator can see it. The coach length must not exceed 33 ft., the headlights should be properly focused and a grab rail should be supplied for passengers entering or leaving the coach.

In the state of New Hampshire, the service brake must stop the coach within 35 ft. at 20 miles per hour.

Bodies are Repainted Every 3 Years

We are allowed a coach length of 30 ft., and outside of this all requirements covered in Massachusetts meet the requirements of New Hampshire.

Outline of Maintenance Plan

The procedure of maintenance may best be outlined by starting with new equipment just received and going into service, and continuing up to the time when this equipment has covered 60,000 miles.

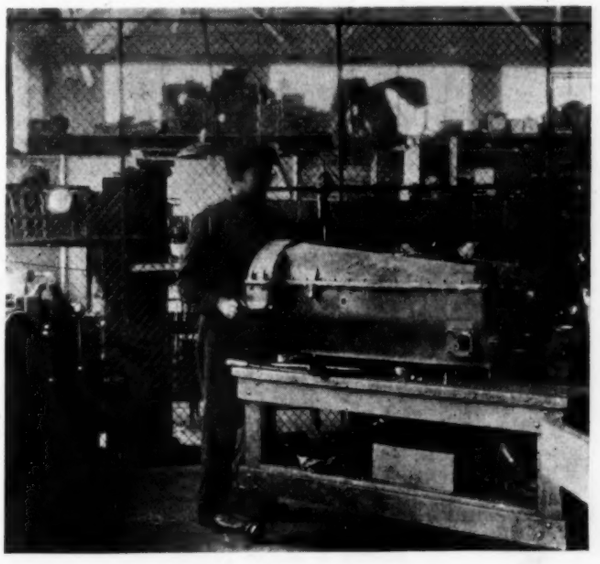
When a new coach is received, the gasoline, oil, and air lines are inspected for tightness; spark plugs are cleaned and adjusted; the magneto or distributor is adjusted; a thorough greasing is given, and the amount of gasoline, oil and water is checked. Experience has taught us that this is a wise precaution, as production work in the factory is mostly on a piece work basis and many slips are made regarding the tightening of various parts and the omission of cotter pins, etc., in vital connecting links. The Mechanical Department then runs the coach at least 100 miles, which shows up any minor adjustments which may be necessary. After this preliminary inspection, the coach is turned over to the operating department with a restriction on speed of not over 30 miles an hour for the first 1000 miles.

Coach Undergoing Complete Overhaul

When placed in service each coach is supplied with a monthly chart, having spaces provided for recording the air pressure which is found in each tire every day. All tires are checked daily. There is also a table showing the pressure which should be carried in the various sizes of tires, the pressure depending upon the position of the tire on the coach as well as on the size of the tire. On the reverse side of this card, spaces are provided for entering the date and speedometer readings at which the following operations are performed: Oil changed; battery filled; 2000 mile inspection and greasing

Responsibility Properly Placed

The mechanic performing each of these operations must place his name in the space provided. This assures proper placing of responsibility in case of any road failures or delays due direcly to the neglect of the mechanic making the check. This card is changed on the first of each month, and the new card shows the date and mileage at which the last entry was made on the old card. This gives a complete record of what work has been done on the coach, when, and by whom. The card, remaining always in the coach, enables a



A Corner of the Engine Room

mechanic in any garage, at which the coach may put up, to determine at a glance just what service work should be performed under the schedule. In addition a monthly gas and oil consumption card is kept in the coach. All gasoline and oil put in the coach either on the road or in the garage is entered, and at the bottom of the card space is provided for the following data: Miles operated during the month; amount of gasoline used; amount of oil used; average miles per gallon of gas; and average miles per quart of oil. These cards are removed from the coaches the first of each month and are forwarded to the office of the Mechanical Superintendent for his inspection and for future reference.

Coaches are Serviced Every Night

It is obvious, in spite of the fact that periodical inspections are made, that some means must be devised to take care of running repairs which must be made from day to day. This is supplied in the form of a daily defect card which is made out by each operator, reporting defects which he wants brought to the attention of the Mechanical Department. The card is left in the coach when it is put up for the night. The night mechanic does what work is necessary, signs his name and turns the card in to the office. The night mechanic also gives the coach a daily inspection, filling out another form on which he indicates the additional work that he has done to put the coach in good working order.

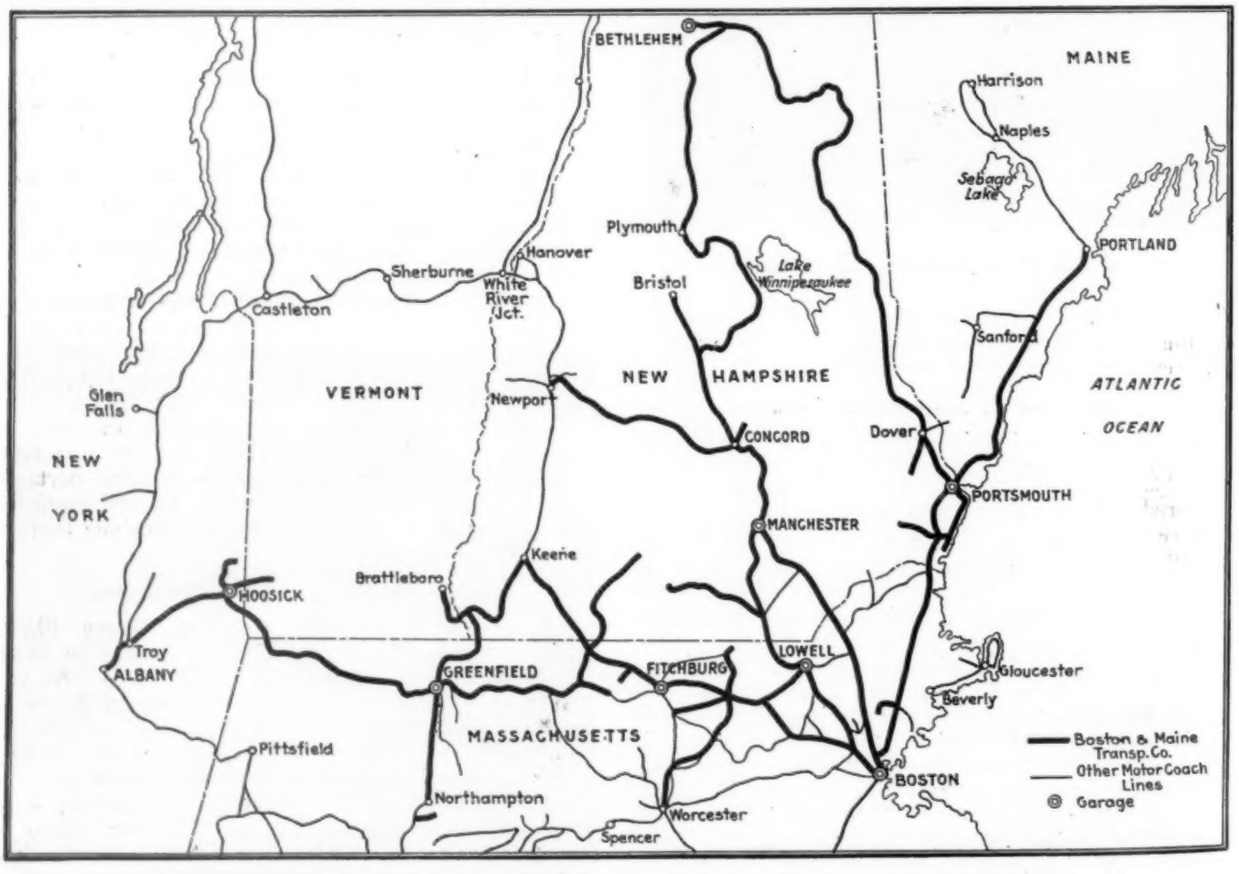
A check is also made every night on the oil, water, gasoline and tools. The form used is made in duplicate, and one copy is left in the coach for the protection of the next operator taking the coach from the garage. We have found this advisable, since each operator is held responsible for these items.

Coaches operating in outlying districts and housed in private garages do not receive this nightly check, but are inspected at regular intervals by traveling mechanics.

When a coach has completed its first 2000 miles of service, and after each additional 2000 miles, it receives in addition to the daily inspection already outlined an inspection known as the "2000-Mile Inspection."

The Semi-Overhaul

In the majority of cases, the "Daily" and "2000-Mile Inspection" cover all the work necessary until the coach has completed 20,000 miles, when it is ready for a semi-overhaul, which includes the following operations: Remove junk heads; remove and clean pistons; renew rings if necessary; tighten bearings and test the crankshaft for oil leaks; renew gaskets; inspect electrical units; clean carburetor; clean and adjust clutch; examine transmission; inspect driveshafts and bearings; inspect differential; examine axle bearings; test rear brake linings and drums; examine front end and steering system; test front wheel bearings and brakes; inspect complete air system; tighten all body bolts; examine the interior of the coach for loose seats, loose screws, rattling windows and any projections liable to tear clothing. In addition to this, damaged body panels are repaired or replaced, the roof is given



Boston & Maine Transportation Company Lines Showing Location of Service Garages

one coat of protecting compound, and the body paint is touched up where necessary.

Repairs to poppet valve engines at semi-overhaul periods include: removal of head, cleaning out carbon, grinding valves, and in addition all work outlined above for sleeve valve engines.

With sleeve valve engines, we have found that the sleeves sometimes break due to hot gases blowing by stuck piston rings. This usually takes place after about 20,000 miles of service. We do not find it necessary to clean out sleeve ports as the amount of carbon found in them at any time is negligible, due primarily to the type of oil which we are using.

All brake rods, clevis pins, levers, and hinge pins are examined for excessive wear and for free action, and the air brake diaphragms are tested for leaks.

General Overhaul

Semi-overhauls are performed at 20,000 and 40,000 miles, and at 60,000 miles the coach is ready for a general overhauling. In addition to the work performed at previous inspection periods, the overhaul includes the following: The engine, transmission, clutch, driveshaft, rear end and front end are completely disassembled and closely inspected and all worn parts are replaced. The engine main bearings are adjusted or renewed, and likewise the connecting rod bearings and wrist pin bushings; new pistons are fitted if necessary, and new rings are installed; the crankshaft is cleaned out; the timing gears and chains are examined and renewed if necessary; the water pump, the fan, the air compressor and all electrical equipment are overhauled. The radiator is removed and cleaned out, the fuel system is completely cleaned, the driveshaft is rebushed, the brakes are relined and the front end and steering system are completely rebushed.

Summary of Emergency Calls
November, 1929

	Number of calls	Total Time delayed
Engine	8	2 hr. 30 min.
Ignition	9	2 hr. 15 min.
Fuel system	4	1 hr. 33 min.
Chassis	5	35 min.
Brakes	2	
Clutch	1	30 min.
Transmission		
Springs	1	
Electrical system	6	57 min.
Accessories	3	25 min.
Total number of calls	39	
" " delays	18	
Average length of delay	13.5 min.	
Delays per 1000 miles	.091	
Miles operated	198,400	

Poppet valve engines frequently show excessive cylinder block wear so that it is necessary to have them rebored and over-size pistons fitted. However, in sleeve valve engines there is apparently an extremely small amount of wear and we hardly ever find it necessary to replace a sleeve except where cracks are discovered after cleaning, or where excessive scoring has taken place.

Body Repairs

At overhaul periods the bodies are repaired as follows: All seats are removed and the exhaust heater pipes are taken out and burnt out with oxygen. When reassembled, these pipes are tested for leaks by running kerosene through the engine, and any leaks thus discovered are eliminated. Maintenance of exhaust heater pipes is quite a problem and has been found to cost about $20 per coach, which is practically all labor. All broken woodwork is replaced and all damaged panels are repaired or replaced. Considerable expense is saved in repairing panels by filling in dents and deep scratches. However, care is taken to see that new panels are installed if the cost of repairs would exceed the cost of new panels.

All body and panel work is done by our own forces; except at outlying points where it would cost more to deadhead the coach to our shop than to have it done by some local concern. All body work is done at semi-overhaul or overhaul periods except in case of broken glass, torn panels and broken woodwork caused by accident. Considerable expense is saved in panel work by doing several small jobs at one time. To repair one panel necessitates the removal of mouldings, which cover several panels, so that some labor is saved by doing all at one time.

Painting

Coaches are thoroughly painted inside and outside every three years. The painting is done by the spray method, and lacquer is used. This method has been adopted because it is cheaper and does not involve as great a delay as other methods. Polishing has been found to be unnecessary as the present lacquers maintain a high gloss.

Cracking around the mouldings and places where weaving occurs has played a large part in the selection of our system of painting. Several attempts were made to overcome this cracking, such as cutting in around mouldings with a razor blade or applying a leather strip under the mouldings, but the cracking was still noticeable. Our process, which overcomes this trouble, is as follows: Mouldings are removed from the body and are sprayed separately, the colors on the body being carried over the sections which are covered by the mouldings. This does away with the bridging of the lacquer, thereby eliminating cracking. The mouldings are then put in place and the screws are painted by spray or hand brushing.

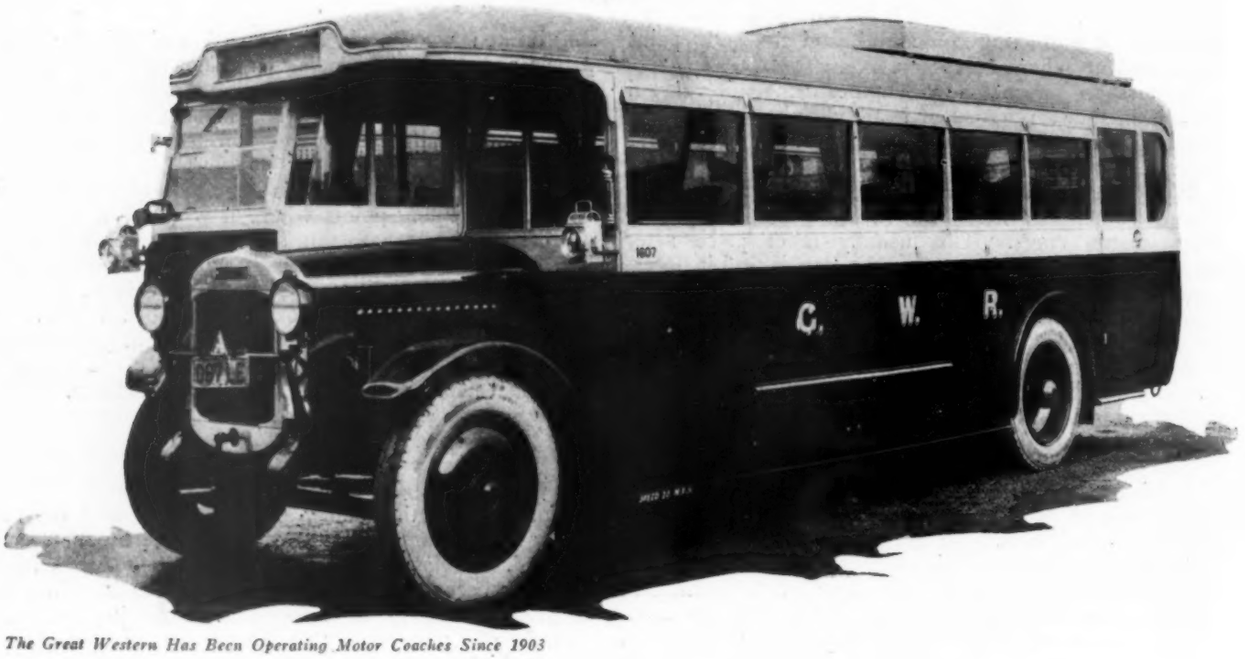
Decalcomania transfers are used for all lettering, and have been found to cut the cost 75 per cent as compared with hand-lettering and we have found that the transfers will outlive three times the gold-leaf lettering applied by hand.

As rapidly as possible, all nickel-plated fixtures are being chromium plated which costs but little more than nickel plating and will withstand weather conditions better. It can be kept clean with a damp cloth, doing away with labor costs of keeping nickel polished.

General painting is handled through the Boston garage which has up-to-date equipment for this type of work. At the Portsmouth garage, a small portable spray outfit is used for partial paint jobs and touch-up work. Two other outlying points use brushing lacquer for touch-up work.

Repair Periods are Being Extended

Semi-overhauls in 1927 were done every 10,000 miles, and in 1928 at every 15,000 miles. In 1929, the interval was established at 20,000 miles. As yet, it has not been found economical to extend the operation beyond this mileage, as it would undoubtedly prove more costly. However, as our maintenance program becomes more efficient, we expect to increase the mileage before complete overhauls. The cutting down of maintenance requirements has been due largely to the proper education of mechanics and to the development of an adequate system of maintenance records.



The Great Western Has Been Operating Motor Coaches Since 1903

Rail-Motor Coach

Co-ordination in Great Britain

Considerable progress made by railways on their policy of co-operation with independent highway operators

By Alfred W. Arthurton

British Railway Companies' Association

IN the 18 months which have elapsed since the passing of the Railway Companies' Road Transport Acts considerable progress has been made in the co-ordination and development of rail and highway passenger traffic. The main object of the railways in seeking from Parliament powers to operate on the highway was to put themselves in a position to supply the public with the most efficient and economical service by rail or highway, or partly by one and partly by the other. In their view, if the usefulness of motor transport was to be developed to capacity and the maximum of benefit obtained by the public, the fullest measure of co-operation and co-ordination between road and rail transport should be secured. The policy of co-operating with existing highway operators to the greatest possible extent has therefore been followed in preference to indulging in a transport war. This avoids heavy capital expenditure, from which the initial return might have been small, and the operation of which would have intensified traffic congestion and increased the cost of highway maintenance, to which the railways contribute.

In pursuance of this policy the railways lost no time in utilizing the powers conferred upon them and at once entered into negotiations with the larger road transport companies. The latter had strongly opposed the railway bills in Parliament, fearing possible competition on the highways and the establishment of a transport monopoly. These fears have been allayed by the attitude of the railways and it is now recognized that partnership with co-ordination of services is desirable. The agreements therefore present possibilities for the solution of the transport problems of the country by the transport industry itself; railways and highways must be complementary.

The negotiations fell mainly under two heads, those with the principal transport concerns of the country and those with municipal corporations. The former are controlled and directed by a few groups of which the principal are:

The National Omnibus Company
The Tilling & British Automobile Traction and British Electric Traction Group
The Scottish Motor Traction Company

Great Western a Pioneer

The Great Western Railway had been operating motor coach services in Devon and Cornwall and other parts of its system since 1903, some time before motor coaches appeared on the streets of London, and claims to be the pioneer of motor coach services in Great

Britain. The National Omnibus Company was also operating in the western counties, and an agreement was entered between it and the Great Western with the view of co-ordinating the interests of the two in Devon and Cornwall. As a result a new company, known as the Western National Omnibus Company, Limited, with a capital of £1,000,000 was formed under the chairmanship of Sir John Jarvis, chairman of the National Omnibus Company. To this new company all passenger road services operated by the two concerns in Devon and South Cornwall were transferred together with equipment and other assets. The stock is held equally by the Great Western and the original National Omnibus Company.

Southern-National Omnibus Agreement

Subsequently an agreement was entered by the Southern Railway with the National Omnibus Company for the operation of motor coaches over a wide area. A new company—the Southern National Omnibus Company—was formed with a capital of £500,000, on the board of which the railway and the National have equal representation. Some 64 highway passenger routes come within the scope of the arrangement, operating in Dorset, Somerset, East Devon and North Cornwall. The agreement resembles that concluded by the Great Western with the same highway company.

L. M. S. and L. N. E. Joint Agreement

One of the most important agreements yet reached is that between the London, Midland & Scottish and London & North Eastern railway companies on the one hand and a group of 36 highway operators covering a great part of the areas served by the two railways in England. The agreement provides for co-operation in the development of traffic by road and rail and for the acquisition by the railway companies of a certain proportion of shares in the motor coach companies. The motor coach companies referred to are those in which either the British Electric Traction Company or Tilling & British Automobile Traction have large holdings, and the arrangement provides for the railway companies' taking up holdings equal to those of the traction group. The prices at which the railway companies acquired the shares were determined by means of a valuation of the services and assets of the subsidiary highway companies. The negotiations in this case affected a capital amounting to £7,000,000.

The L. N. E. had already acquired control of certain services in Northumberland and a partial interest in several other highway companies operating in Durham and Yorkshire. In July, 1929, in conjunction with Tilling & British Automobile Traction, Ltd., arrangements were made to purchase United Automobile Services, a company with a capital of £500,000, operating 700 motor coaches in territory on the east coast of England extending from Suffolk to Northumberland. A new company was formed in which the two purchasers have equal control, the chairman being the northeastern divisional general manager of the L. N. E.

Developments in Scotland

In Scotland an important agreement by the L. M. S. and L. N. E. with the Scottish Motor Traction Company involves the greater part of the country. As soon as the railways secured road powers from Parliament last year the motor coach companies began to prepare for developments and large fusions took place which enabled them to meet the railways with an almost solid front. From the circular letter addressed to the shareholders of the Scottish Motor Traction Company it would appear that the directors, believing that the railways might put their newly acquired powers into operation immediately, regarded the situation with grave con-

Motor Coach Operated by the London, Midland & Scottish

cern. Such powerful competition would have been a serious factor in the future conduct of the highway company's business. The directors were therefore convinced that co-operation with the railways was much more desirable than competition. Under the agreement the railways are not to compete in highway passenger services with the Scottish Motor Traction Company or any of its associates within an agreed area, but generally to co-operate in the co-ordination of road and rail services, on condition that the company shall be reconstructed and that the railway companies shall acquire a substantial interest in the capital, appointing two of the new directors. The name of the company is retained, the capital is £1,800,000 and the two railways jointly have acquired a one-half interest in the ordinary shares.

Working of Agreements

In connection with each motor coach company, in which the railway companies have any capital, a joint committee, consisting of an equal number of representatives of the railway company and the motor coach company has been constituted to propose measures by which the services of the two modes of transport can be co-ordinated. It will consider such questions as the possible closing of stations and branch lines, inter-availability of tickets, combined long distance travel by rail and road and the provision of rail and road travel bureaus. In doing so they are under obligation to take into account the requirements and convenience of the traveling public, the public demand for any particular form of transport, as well as the existence of any other services of transport in the district. There has thus been established between the two parties to the agreement a very real medium for exchanging ideas for the benefit of the public as well as of themselves. It will be seen also that there is no monopolistic system set up, but that there will be a certain element of conflict of interest and competition, the whole being leavened by the interests of other shareholders, many of whom reside in the localities in which the motor coach companies operate.

In addition to the agreements with the three main groups of road transport concerns in Great Britain many other arrangements in particular districts have been made by individual railways.

Minor Co-Ordinating Plans

An arrangement affecting more than half the population of Wales has been entered by the Great Western with the South Wales Commercial Motors, Ltd., of Cardiff. A new company under the title of the Western Welsh Omnibus Company, Ltd., has acquired the road motor services run by the Great Western, the South Wales Commercial Motors, Lewis & James and the Western Valleys Motor Service. The new company has an authorized capital of £500,000 and the area covered by its activities embraces the greater part of industrial South Wales and Monmouthshire. It is stated that the new and enlarged company will revolutionize transport in South Wales and benefit the traveling public considerably. The lines will be equipped with equipment stock and there will be efficient services and reliable timetable. The Great Western interest in the new company is 50 per cent, and four of the eight directors are nominated by it.

The case of the Crosville Motor Omnibus Company of Chester differs from the majority of other transactions of the kind in that an outright sale to railway interests was involved, instead of the creation of a joint interest. It has the added element of interest of uniting two railways—L.M.S. and Great Western—in the new ownership. The purchase price is just under £400,000. The Crosville Motor Company had more than 150 different services, covering considerably more than 1,250 route miles. Between 400 and 500 towns and villages with a total population of 4,000,000 are served by a network of routes embracing the whole of North Wales and stretching into 14 counties, including Cheshire, Lancashire, Shropshire, Flint and Denbigh. One of the company's enterprises was the establishment of regular daily highway services between Liverpool and London and Birkenhead and London. It is interesting to observe that the chairman of the Crosville Company, in recommending the shareholders to accept the railway offer said that "although they were not afraid of the railway companies yet it was better to work with them than against them. The latter had decided on a policy which, although it was not intended deliberately to oust companies like the Crosville, could cut into their system in different places and would tend to reduce profits."

Great Western-Southern Joint Purchase

Another method of purchase is that adopted by the Great Western and Southern to obtain a financial interest in the Devon General Omnibus & Touring Company. This company has about 147 motor coaches and operates some 30 services in South Devon, radiating principally from Exeter. The capital is £130,000 largely held by the Torquay Tramways Company, which has now disposed of 15,000 ordinary shares to the railway companies.

During 1929 the Southern became interested in all the more important highway concerns in the south of England and is now represented by its own officers on the boards of directors and management committees in each case. Among these road transport companies are the Aldershot & District Traction Company, Ltd., East Kent Road Car Co., Hants & Dorset Motor Services, Maidstone & District Motor Services, Southdown Motor Services, and the Southern Vectis Omnibus Company operating in the Isle of Wight.

Municipal Agreements

The relations of the railways with the street railways and motor coach lines operated by the municipalities they serve have always been of an amicable character, and it was therefore natural that the question of co-operation with the corporations in the conduct of their motor coach services should have arisen at an early stage. Negotiations were commenced first with the municipal authorities of Sheffield and the basis of the agreement entered with that body by the L.M.S. and L.N.E. was that the municipality retains sole control of the intracity motor coach routes; the railway companies purchased a half share in the suburban services of the city which are now operated jointly, and purchased outright certain long distance services. Under this equitable arrangement Sheffield stood to lose little, while the railways, undoubtedly gained. The public also were not deprived of transport facilities to which they were accustomed, nor involved in a price-cutting war brought about by unrestricted competition. The conclusion of the agreements was proof of the public spirit animating both the railway companies and the city.

Similar arrangements have been made or are in process of negotiation with other municipalities. At Halifax, for instance, an arrangement was brought into operation on April 1, 1929, whereunder the L.M.S. and L.N.E. became associated with the municipality on the lines of the Sheffield agreement. The highway routes

confined to the borough are to remain under the control of Halifax authorities, but the routes to Huddersfield, Ripponden, Sowerby Bridge, Bridghouses, etc., will be controlled by a joint committee of four representatives of the city and four nominees of the railway companies. Any motor coach services which may be developed further afield to and from Halifax will be operated by the railway companies. Precisely similar arrangements have been made at Leeds.

Active negotiations are proceeding with the corporations of other big industrial centres like Manchester, Glasgow, etc., with the view of arriving at similar agreements. These arrangements open up prospects of very useful public service and will provide a valuable link in the transport organization of the future.

Important Recent Developments

One of the latest agreements to be concluded between rail and road transport companies is that of the Great Western with the Bristol Tramways & Carriage Company. On New Year's eve it was announced that following lengthy negotiations, which had once been broken off and only resumed after several months the

Interior of a Great Western Motor Coach

Great Western had acquired a financial interest (in which the L.M.S. Company will share) in the Bristol Tramways Company which operates over 450 motor coaches, thus bringing one of the largest of their remaining motor coach competitors into the railways' sphere of influence.

Negotiations are approaching completion, jointly with the L. M. S., for the acquisition of a 50 per cent interest in the undertaking of the Birmingham & Midland Motor Omnibus Company, Ltd. In another case, that of the Trent Motor Traction Company, Ltd., the L. M. S. and L. N. E. have obtained an interest, though not a controlling interest, in the road company and a joint committee on the lines of those set up in other cases is to be formed.

Numerous Minor Agreements

Numerous agreements of a minor character have been made with highway transport interests in other parts of the country, particularly in the north and east. There have been many practical differences associated with the problem of securing satisfactory permanent relations between the railway companies and highway concerns, but, as will be seen, it is by no means impossible to bring about a full measure of co-operation which will remove wasteful competition on the highway and at the same time considerably benefit the parties concerned by the joint development of traffic.

The railway companies also operate highway services of their own in certain areas, and these will be continued where they have not been merged into one or other of the new companies brought into existence under the various agreements. The Great Western, for instance, has motor coach services in the London area, in North Wales and the West Midland counties. Between London and Cheltenham an alternative rail and road service is in operation. Passengers are taken by fast train to Oxford, thence by one of the latest type of long distance parlor motor coaches by road to Cheltenham or vice versa. There are four such services daily and the fares charged for the combined rail and road trip are considerably cheaper than by rail throughout—although the time occupied is longer—and approximate closely competitive highway fares. The L.M.S. also has motor coach services of its own in the London area, in Yorkshire and in Scotland.

In view of what has been stated it may fairly be claimed that in the comparatively short time since the passing of the Road Transport Acts the railway groups have laid the foundation for the co-ordination of rail and road traffic in Great Britain. In August, 1928, when the Acts were passed, they owned among them no more than 348 passenger motor vehicles. They are now directly interested in a fleet of approximately 8,000 vehicles. The proportion of their financial interest in the road concerns with which they have become associated varies. In some cases it is 50 per cent, but in general it is equal to the other largest shareholder. The arrangements completed cover a large part of the country and are working satisfactorily; other negotiations are in hand for practically the whole country.

Types of Co-Ordination

By the agreements in force and the policy pursued the railway companies are in a position today to offer better services to the public, and by their investments in highway service they have renewed the interest of their stockholders in traffic which has hitherto been regarded as "lost" by the railways to the roads.

This has been accomplished and a co-ordination of traffic effected without a wasteful transport war which could only have been carried on at the expense of the stockholders and the traveling public alike. Co-ordination of services may be expected along the lines of:

Feeder services concentrated on the larger railway stations from outlying points up to 20 miles distant, facilitating in some cases closing down of passenger services on branch lines.

Parallel services, relieving the railway lines of local traffic at intermediate points between important stations or junctions, enabling intermediate stops to be cut out on important sections of line.

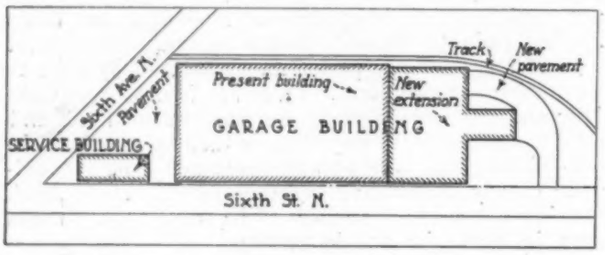
Link services to join up important centers on parallel railway lines, thus curtailing passenger services on branch lines.

Round-trip interchangeable services, outward by rail and home by road or vice versa.

It is thought that co-ordination of rail and highway services must subordinate sectional interests to the interests of the whole and make the conveyance of the passenger the prime consideration. Thus where the highway is the most suitable means of transport, motor services may well be permitted to supply the travel needs unchallenged by the railway, and on the other hand much of the present highway traffic may be left to the railway as the most suitable conveyor.

Northland Adds to Garage Facilities at Minneapolis

THE Northland Transportation Company, former motor coach operating subsidiary of the Great Northern and now operated as a part of the Northland-Greyhound Lines, is completing at Minneapolis, Minn., the construction of enlarged operating and maintenance facilities made necessary by steady expansion in its operations. The enlarged garage building not



General Layout of the Northland Garage Facilities at Minneapolis

only provides additional badly needed space for storage and maintenance, but embodies features of layout which should add measurably to the efficiency with which servicing operations are performed. A separate service building for the use of drivers and operating department employees, which has been constructed, represents a long step away from the crude facilities frequently provided for such employees.

The garage building which has now been enlarged was a structure 285 ft. long by 160 ft. wide, located at the intersection of Sixth Avenue, North, and Sixth Street, North, in Minneapolis. The second floor of the two-story building is used to accommodate the general offices of the company. With the addition, the garage is now 456 ft. long overall, the major part of the addition being 156 ft. wide, 64 ft. of the additional length being taken up by the washing facilities, housed in an extension of the main structure, 40 ft. wide.

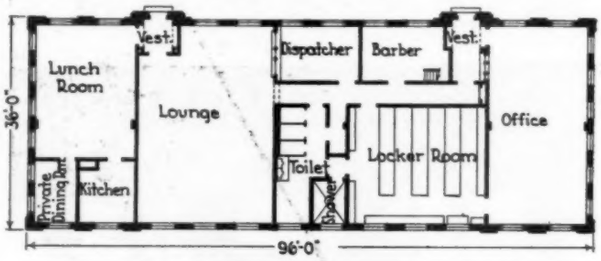
The arrangement of the garage is such that motor coaches coming in off their runs pass directly from one servicing and inspection department to the next until they reach the storage space, where they remain until such time as they are scheduled to leave on other trips. Thus a coach coming into the garage proceeds along the driveway from Sixth Avenue to the rear of the garage building, where it enters either one of the jackknife doors and stops in one of the two wash-racks.

Its washing completed, the coach moves forward to the combination greasing pit and brake testers. The pit occupies about two-thirds of the 39 ft. by 46 ft. section devoted to greasing and brake inspection, so that a coach can be routed around the grease pit and brake testers into the storage room if desired. Immediately to the right, as one enters this area, is the tire room, 21 ft. by 46 ft., where tires are stored and repaired. Beyond is the storage space for service cars.

At the opposite side of the grease pit are the battery room and three paint rooms. The battery room is 22½ ft. by 14 ft., while the paint rooms are 22½ ft. by 45 ft., 23 ft. by 45 ft., and 23 ft. by 14 ft. respectively.

Next towards the front of the garage is the 128-ft. storage space and beyond this the 112-ft. shop room where inspections and running repairs to the motor coaches are made.

Extending from the shop room to the front of the building is a 31-ft. driveway, in the middle of which is an island upon which gasoline pumps are located. To

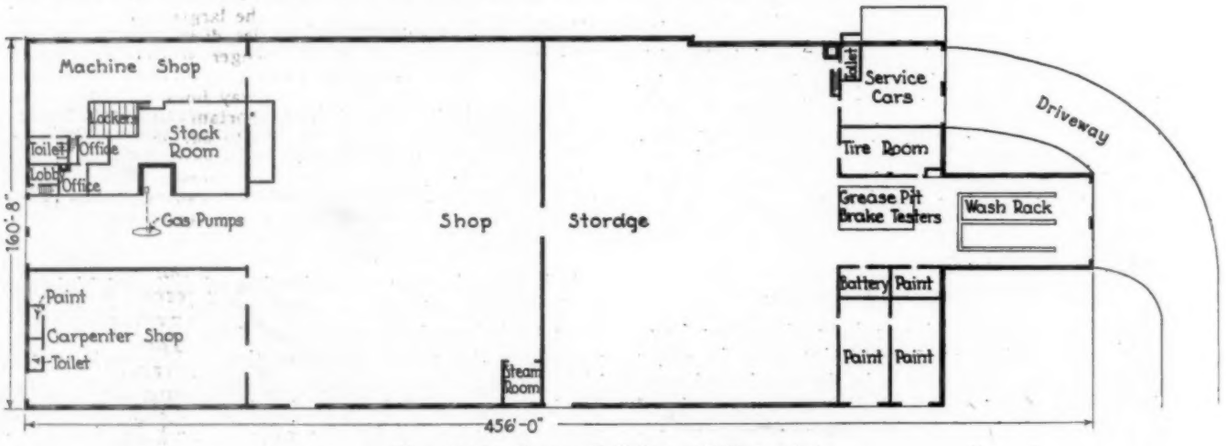


Floor Plan of the Employees' Service Building

the left of the driveway, facing toward the front of the building, is the carpenter shop, which is a room 96 ft. by 58 ft.

On the opposite side, occupying an area 96 ft. long and 58 ft. wide, are located the stockroom and the machine shop where unit repairs are made, together with locker and washrooms, two offices and a small lobby.

The service building is a one-story brick structure, 96 ft. long by 36 ft. wide, located in the area between the front of the garage building and Sixth Avenue. At the front of the service building is the office, while back of it are the locker room, with toilet and shower-bath facilities, for drivers, a room for the valet and barber, the dispatcher's office and a lounging room for drivers. At the rear is the lunchroom and kitchen, with a small private dining room.



Plan of the Garage Building and Extension

John B. Walker

Selling More Rides

A description of the merchandising and advertising methods used by the Greyhound Lines in developing more intensive motor coach passenger traffic

By John B. Walker

Sales & Advertising Manager, The Greyhound Lines

DEVELOPMENT of motor transportation has been so rapid that definite management policies have but lately begun to take form. The industry has been so involved in the improvement of equipment and service, the extension of routes and the pioneering of a new form of transportation, that time has been available for little else.

Traffic promotion, if indeed early efforts to develop motor coach patronage could be given such a title, was confined to sidewalk solicitation, passing out hand bills and chalking a list of towns and fares on the windows of the coaches.

Motor coach transportation has not even yet completely outgrown these crude methods, but during the past two or three years, the larger and more progressive companies have been comparing experience, studying rail traffic promotion methods, and shaping rather definite programs of traffic promotion.

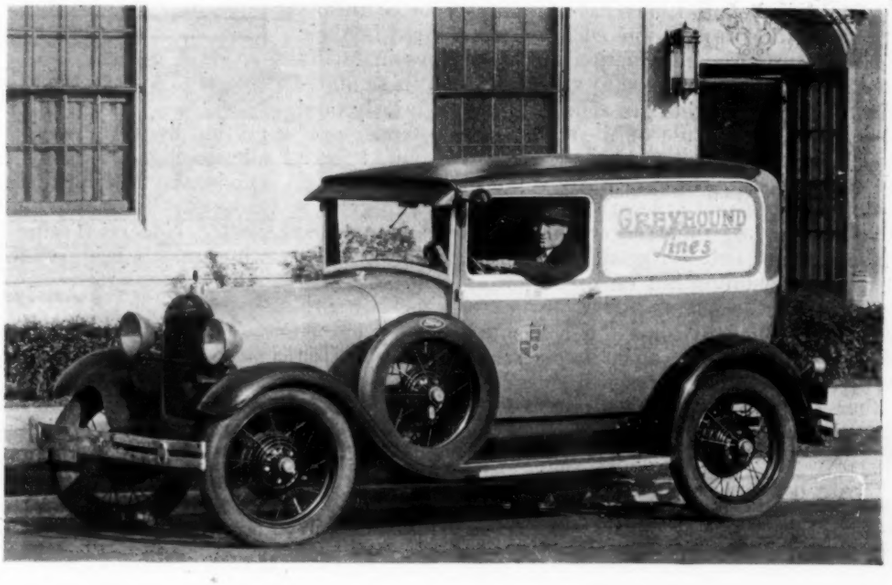
Among the pioneers in this work was the Greyhound Lines, now the largest in the field of inter-city operation. In approaching the task, they realized that motor coach traffic promotion presented problems radically different from those encountered by the railroads: Rail routes are fixed; rail rates are stabilized; rail competition is definitely known. Motor coach routes, on the other hand, are highly flexible; coach fares, especially in interstate service, are subject to constant change; coach service is influenced by weather, road conditions, and other traffic. These, and a score of other factors outside the control of management, affect motor coach operation and patronage.

Faced with these handicape in developing a traffic promotion program, the Greyhound Lines proceeded on the assumption that prospective patrons of motor coach transportation would respond to the same appeals that have been proved successful in merchandizing other products and services. They set up their program much as would a manufacturer, on the following basis: (1) Perfection of Product (in this case, service); (2) Analysis of Market; (3) Sales and Advertising Campaign.

Results to date so vindicate this policy, that an outline of its operation may be of interest and value to other operators.

The first principle, perfection of product, translated in terms of motor coach operation, means up-to-date equipment, clean and inviting in appearance. It means dependable service, on-time schedules, direct connections for through passengers; it means well located depots and competent ticket agents; careful, courteous drivers. It covers, in fact all phases of motor coach operation which come into contact with the traveling public. In motor coach transportation, service is the product.

Therefore, the two most important factors are the coach itself and the driver. It is with these that the



Greyhound Supervisor and Traffic Car

These supervisors visit agents at least twice a month and replenish their supply of tickets, tariffs, schedules, literature, etc. They also supervise the operation of the lines in their territory.

public comes into most frequent and intimate contact. It is from these that the public gains its impression, good or bad, of the service.

The first problem then, is to strengthen the appeal of these salesmen. Good service is its own best advertisement, and for this reason every motor coach that plies the highway should be kept as clean and inviting as possible. Washing is the cheapest advertising available.

Too much attention cannot be given the problem of driver selection and training. Upon the shoulders of these men rest the responsibility of interpreting to the public the policy, aims and ideals of the company. Drivers should be schooled and re-schooled in the principles of safe operation of coaches. The importance of neatness in dress and of courtesy in their contact with the public should be indelibly instilled into them. They should be made to realize fully the serious responsibility of their position.

The next logical step should be improvement of stations. The motor coach is regarded as a cheap, unstable form of transportation by thousands of people because of the type of depots from which many concerns operate. Investment in station improvement pays big dividends in increased patronage. Many stations in smaller towns are located and will continue to be located in hotels, restaurants, etc. Too few of these stops are properly marked. Signs are cheap advertising. Two or three sales lost through the inability of prospective passengers to locate the station will pay for a sign.

Interline Relations

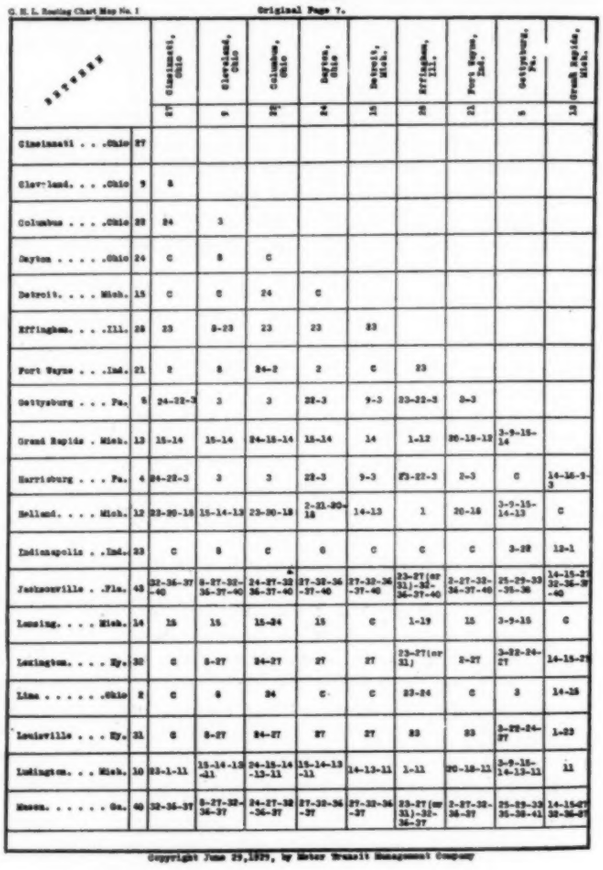
No motor coach company can develop the full potential business in its territory until it can offer transportation beyond its own lines. To this end, every company should establish interline relations with other operations which touch its lines. Such relations are mutually beneficial. The interchange of schedules and tariffs with other operations enables the agents of each to quote fares and service direct to many additional points, and results in considerable "feeder" business.

Having established a system of transportation through interline agreement, the next problem is to make the system work. To this end, every agent and other employee who comes in contact with the traveling public must be well informed of the service available. They must know the company's tariffs and schedules and those of connecting lines. They must have a good working knowledge of geography so as to route passengers in the most efficient manner.

The Greyhound Lines have developed three means of instructing agents on such points. First is their bulletin system. Information on all changes in tariffs and schedules is conveyed to agents through these bulletins. These bulletins are numbered consecutively, and the agents keep a file of them in a special binder provided for this purpose. Second, is the Greyhound force of supervisors. These men are equipped with cars and call on every agent at least twice a month. Supervisors live midway of the territory they serve, and are responsible not only on matters pertaining to traffic and revenue promotion but on operation as well.

Most of the agents for motor coach lines are primarily engaged in some other business. They handle tickets as a side line on a commission basis, and often only because the motor coach rider patronizes them for other things. To develop any real interest in motor coach transportation on the part of such agents is, indeed, a task. The best method yet discovered is personal contact at frequent intervals, as is followed under the supervisor system of the Greyhound Lines.

The third method insures elimination of mistakes by agents in routing passengers. This consists of a routing chart map as shown on an adjacent page. The map illustrates all routes, principal cities and division points on the Greyhound and connecting lines. The division or ticket tear points are indcated by numbers, and the routes by letters. By referrng to this map and its accompanying index, any agent can select the most direct and inexpensive route for passengers. Optional routings are also included. Under the Greyhound ticket system, a separate coupon is required for each division. This routing chart eliminates all possibility of error on the part of agents in selecting ticket forms. It specifies exactly the form to be used, designates the simplest, shortest and most convenient route between any two points, and indicates the lines and inter-con-



G. H. L. Routing Chart Map No. 1 — Original Page 7.

REVERSE		Cincinnati, Ohio	Cleveland, Ohio	Columbus, Ohio	Dayton, Ohio	Detroit, Mich.	Effingham, Ill.	Fort Wayne, Ind.	Gettysburg, Pa.	Grand Rapids, Mich.
		27	9	29	24	15	20	21	6	13
Cincinnati . . .Ohio	27									
Cleveland. . . .Ohio	9	8								
Columbus . . . .Ohio	29	24	3							
Dayton . . . . .Ohio	24	C	B	C						
Detroit. . . . Mich.	15	C	C	24	C					
Effingham. . . .Ill.	20	23	8-23	23	23	23				
Fort Wayne . . .Ind.	21	2	B	24-2	2	C	23			
Gettysburg . . . Pa.	6	24-22-3	3	3	22-3	9-3	23-22-3	8-3		
Grand Rapids . Mich.	13	15-14	15-14	24-15-14	15-14	14	1-12	20-19-12	3-9-15-14	
Harrisburg . . . Pa.	4	24-22-3	3	3	22-3	9-3	F3-22-3	8-3	C	14-15-9-3
Holland. . . . Mich.	12	23-20-18	15-14-13	23-20-18	2-21-20-18	14-13	1	20-16	3-9-15-14-13	C
Indianapolis . .Ind.	23	C	B	C	C	C	C	C	3-22	12-1
Jacksonville . .Fla.	43	32-36-37-40	8-27-32-36-37-40	24-27-32-36-37-40	27-32-36-37-40	27-32-36-37-40	23-27(or 31)-32-36-37-40	2-27-32-36-37-40	25-29-33-35-38	14-15-27-32-35-37-40
Lansing. . . . Mich.	14	15	15	15-24	15	C	1-19	15	3-9-15	C
Lexington. . . . Ky.	32	C	8-27	24-27	27	27	23-27(or 31)	2-27	3-22-24-27	14-15-27
Lima . . . . . .Ohio	2	C	B	24	C	C	23-24	C	3	14-15
Louisville . . . Ky.	31	C	8-27	24-27	27	27	23	23	3-22-24-27	1-23
Ludington. . . Mich.	10	23-1-11	15-14-13-11	24-15-14-13-11	15-14-13-11	14-13-11	1-11	20-18-11	3-9-15-14-13-11	11
Macon. . . . . Ga.	40	32-36-37	8-27-32-36-37	24-27-32-36-37	27-32-36-37	27-32-36-37	23-27(or 31)-32-36-37	2-27-32-36-37	25-29-33-35-38-41	14-15-27-32-36-37

Copyright June 25,1929, by Motor Transit Management Company

A Page from the Routing Chart Tariff

necting lines of travel. It completely removes possible questioning of the ticket enroute, and thereby eliminates any confusion and embarrassment of passengers. This routing chart was designed by L. D. Koller, General Traffic Manager of The Greyhound Lines and is being widely adopted by other companies.

Analysis of Market

The second major step in developing motor coach patronage deals with a careful analysis of the territory served by the operation to determine its traffic potentialities. This should include thorough consideration of the community of interest existing between the cities served by the operation, and careful and continuous analysis of past revenue and passenger records. This discloses the travel tendencies of various communities, and paves the way for intelligent promotional work.

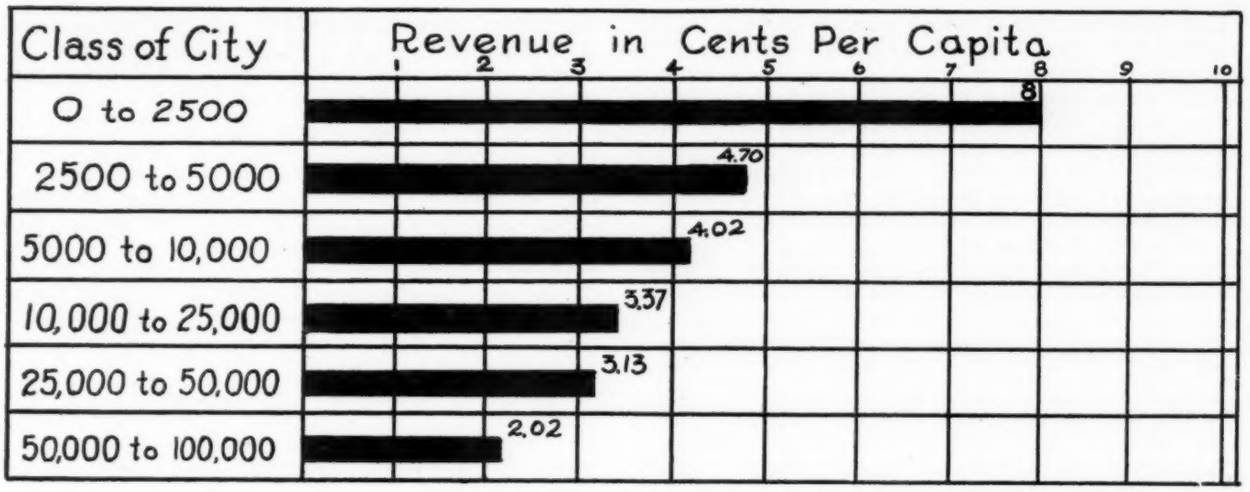
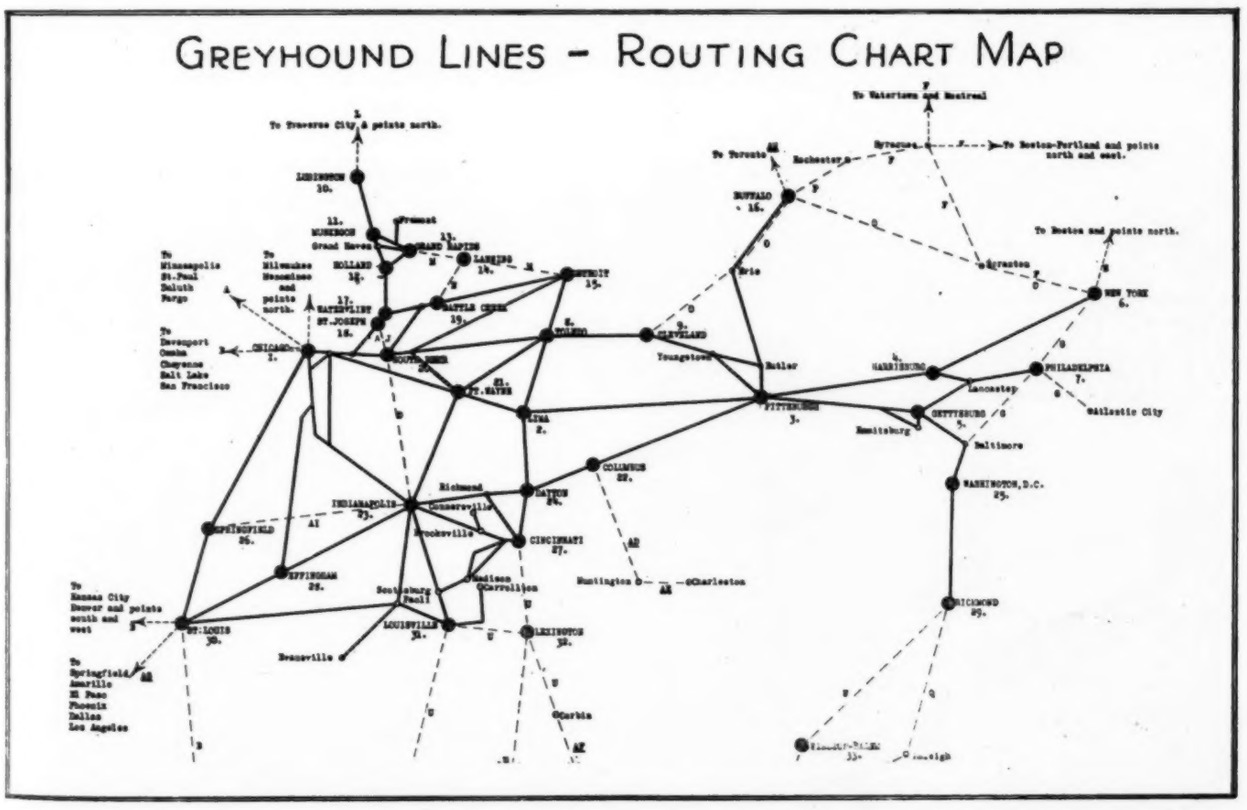


Chart Showing Revenue per Capita

A comparison should be made between cities and villages of the same size to determine the gross revenue per schedule and per capita. The Greyhound Lines have analyzed revenue reports in this way for every town on their system and have discovered some amazing and vital facts. It was discovered that many cities, of the same size and with all conditions fairly equal, showed a tremendous variance of revenue. The chart reproduced herewith summarizes the average revenue per capita per month of the cities on the Greyhound Lines from those under 2,500 on up to those of 100,000 population. It shows that villages and towns under 2,500 population produce by far the highest revenue per capita and indicates the need of more intense traffic promotion in the cities.

All forms of competition, motor coach, rail and traction, should be charted and studied. Their strongholds —the cities and towns in which competition is better intrenched—should receive special attention. Comparison should be made of stations and personnel, of equipment, schedules and fares. Unbiased investigation should be undertaken to determine the public attitude toward the various transportation mediums. The findings of this investigation will aid materially in shaping sales and advertising efforts.

In promoting motor coach travel, the Greyhound



Routing Chart Map

Lines have experimented with many different sales and advertising ideas. They have found that a field organization personally calling on agents, hotels, schools, travel bureaus, etc., is a necessary and most valuable unit in their traffic promotion program. They have found that the consistent use of display newspaper advertising is the best means of presenting the merits of motor coach travel to the public, and of supplementing the personal efforts of the field organization.

As a basis for their sales and advertising, The Greyhound Lines have set up six major appeals for motor coach travel. These are: Economy, pleasure, comfort, convenience, safety and dependability. In developing their newspaper advertising, the Greyhound Lines make use of all six appeals, but put special emphasis on economy. A selected list of cities with fares thereto appears in each advertisement. The days on which to advertise, size of space, and the frequency of insertion are all carefully worked out. No advertising is ordered for Fridays, Saturdays or Sundays, due to newspapers being filled on these days with department store advertising, and the consequent danger of small motor coach travel advertisements being "buried." Small size space is used in weekly newspapers and small dailies, but larger space is necessary to attract attention in city papers. Very little advertising is done in the peak traffic months of July and August.

Perhaps of equal value with newspapers as an advertising medium is the time-table. Time-tables hold a certain fascination for people. They like to study them, figure out the trips they might some day take, etc. Maps in the time-tables are absolutely necessary. In addition to your own time-tables, it is quite advisable to display those of connecting and even distant lines, as these tend to create travel demand. Folders featuring California and Florida, summer and winter resorts are also good.

Another form of advertising that has been found effective is window cards. Greyhound supervisors take these in their cars and put them up wherever possible. The names and addresses of the local stations are filled in with a rubber stamp. Special excursion rates, announcements of additional service, new equipment, etc., furnish good copy for these cards.

News Publicity

Closely coupled with the subject of advertising is that of publicity—news items appearing in the daily press. Too often such items as appear are unfavorable in that they refer to accidents and litigation. Favorable publicity is worth more than an equal amount of advertising and can and should be cultivated. No newspaper editor wants and few will use publicity that is obviously but little more than an advertisement—but all editors want news.

What is news in motor coach transportation? The establishment of new operations or extension of service, the addition of new equipment, establishment of inter-line connection providing improved service, changes in personnel, re-location of depots, garages,—all of these things are news. All of them justify printing the name of the operation and any of them appearing in a news item is worth real money to the company.

Publicity of the right sort plays another and most important role in selling motor coach transportation. It builds up knowledge and confidence on the part of the public in this mode of travel. The motor coach industry needs the confidence, approval and support of the public.

There is a demand these days that everything be regulated. The motor coach industry cannot and does not expect to escape regulation, but it should work for regulation that is in the interest of sound, efficient and progressive operation. Public confidence, approval of and demand for motor coach service developed through good advertising, publicity and sales promotion will have a most beneficial effect in shaping favorable regulation and in establishing motor coach transportation as a major factor in the nation's system of transportation.

* * * *

Why Truck Lines Attract Traffic

Motor truck transportation companies offer better service at lower rates—Would prefer similar railroad-operated service

By An Industrial Traffic Manager

AS traffic manager of a nation-wide distributing organization, with branches and warehouses in every trade center of importance, the writer is in an advantageous position to observe and compare the development of motor truck transportation as a competitor of the railroads in various sections of the country.

That the motor trucks are taking freight away from the railroads to some extent, we find, in the light of our experience, to be rather generally true in every locality; but nowhere in the United States are the trucks making such inroads upon the freight traffic of the railways as they appear to be in California. Upon the highways of this state there is, relatively, more freight being hauled by motor truck, there are more trucks operating, and there are more people in the trucking business, than in any other part of the country.

Competition of motor truck lines for freight once handled by railways has become increasingly severe in many parts of the country, but nowhere more keen than in California. Why are shippers routing their traffic via truck lines instead of railway? A straight-forward answer is given in this article by an industrial traffic manager, who has asked that his statement be published anonymously.

The reason for this great popularity of motor truck transportation, as compared with rail transportation, is summed up in these two advantages which the truck operators offer the shipper: Cheap rates; and a total absence of any limit upon the extremes to which the average truck operator will go to accommodate a patron, or, more especially, to outdo a competitor, even if he loses money by it. Both of these factors are a direct result, not a competition between the trucks and their natural competitor, the railroads, but of cut-throat competition of the most ruthless sort between the truck operators themselves.

Of California, it recently has been said, and without so much exaggeration as one might think, that everyone in the state who doesn't run a filling station is in the trucking business. As an indication of how nearly true this witticism may seem, a review of the regular published calendar of the California Railroad Commission show that there are pending before that body eighteen cases involving motor truck operations—Certificates to operate, extension of service, adjustments of rates, and so on. In other words, there are in the state so many truck operators, counting only those under the jurisdiction of the railroad commission, to say nothing of the innumerable "wild catters," that eighteen is not an unreasonable number of them to be up before the railroad commission at one time, for some reason or another.

In fact, there are so many operators in the business, and competition between them is so keen, and in many cases so unscrupulous, that by shopping around the shipper can get almost any kind of rate, and almost any concession in the way of service, that he wants. And that is why the railroads, hampered by tradition and custom and rules, are rapidly losing their business to the trucks.

It is not necessarily intended to imply that the conservative policy of the railroads, by which they are losing the business, is unsound; or that the extreme practices of the trucks, by which they are attracting the business, are sound. As a matter of fact, though a traffic manager is commonly reputed to have but one purpose, and that is to secure the lowest possible rates and unlimited service, at the risk of appearing disloyal to the profession we can sincerely say that the truck operators of California, as a result of their own unwise, almost foolhardy, competition among themselves, are giving to the shippers far more service, and at a much lower rate, than it is either necessary or economically sound for them to give.

An l.c.l. rate, for example, of two dollars a ton from the steamship docks at Los Angeles Harbor into a warehouse at Los Angeles, for even the heaviest kind of freight, is too low; but many tons of general merchandise, including wicker furniture that will load not more than five tons to the truck and trailer, have been and are being hauled for that rate. The distance is twenty miles, and the rate includes loading at the dock, unloading into the warehouse, and in some cases stacking the stuff up into stock piles. The cheapest rail rate for the same stuff is $3.40 a ton, plus a loading charge at the dock and plus drayage in Los Angeles.

From truck lines that also do a warehousing business in Los Angeles, many offers have been received to haul large stock orders free from the harbor in return for the job of warehousing it. There would be no increase in the warehouse rate; the free transportation would be thrown in to enhance the attractiveness of the bargain—like a two-pants suit—and to keep the railroad or some other truck line from getting the business.

Such practices are petty. But they are mighty attractive to the shipper.

Probably the most vivid example of the disparity between the truck carriers and the railways is to be found in a movement from our main warehouse in San Francisco to an inland city 205 miles distant. The railroad rates on the mixed commodities involved would range from 74½ cents to 47½ cents, an average of, say, 60 cents per hundred pounds, plus 10 cents per hundred

for drayage to the freight depot in San Francisco, and another 7½ cents for drayage at distination; a total of 77½ cents a hundred, or $15.50 a ton. The truck line's rate, including pick up at the warehouse in San Francisco and delivery to the consignee at destination, is—believe it or not—$5 a ton; and there are four truck lines begging for the business at that rate.

Assuming that the railroad's rates are just and reasonable for the service performed, there is no reason in the world why any "store-door" to "store-door" truck rate should ever be lower than the rail rates. In fact, considering the added collection and delivery service given by the trucks, their rates might very properly be a few cents higher than rail rates. How the truck lines ever come to be so shortsighted as to beat them down so low as they have, is hard to understand.

The disparity described is not unusual, or merely an exaggerated case. It is typical of the situation as it appears to prevail pretty generally throughout the state; and though there is some question as to whether it represents a profitable business for the truck operator, there is no doubt whatever about how serious a menace such a rate structure is to the railroads.

Operating Loss Probably Results

Of the particular commodities involved in this 205 mile haul, a truck and trailer will carry not over 17 tons. With an empty back haul, as is most frequently the case, the gross earnings will be $85 for a 410 mile round trip—20 cents a mile. The commonly accepted figure, in the few cases where our own equipment is used, is a cost of 30 cents per truck mile, and 32 cents per truck and trailer mile. Figure it out for yourself whether the operator, after setting up the proper fund for replacements, is coming out whole.

It is more than likely that the truck operators themselves have never figured it out; but whether or not they are coming out whole, the fact remains that they continue, by whatever means, to operate, and if one operator goes broke there appear always to be plenty of others to take his place. And the average shipper, if he is looking for bargains in transportation, is little concerned with who happens at the moment to be the operator of the trucks, just so the rates are cheap.

Possibly, in some cases, the truck operator is not concerned about a depreciation fund; for inquiry has just elicited the rather surprising information that among certain truck manufacturers it is common practice for them to furnish equipment, without even a "down" payment, to any reasonably reliable individual or firm who can find work for it to do. The usual arrangement is that all the earnings go to the manufacturer. He deducts first an amount representing the monthly installment on the truck. If anything is left it goes to the operator. In Chicago, this would be, not a business, but a "racket."

Packing Requirements

Service, to the shipper, is no less controlling than are rates; and one of the first and most important factors going to make up an attractive service is a set of flexible rules pertaining to packing and marking requirements. The truck lines will take anything which, from a practical point of view, can be transported without unreasonable risk of damage; while the railroads are so bound up in their rules of prohibition that there are a great many articles that they can't handle at all. Even though a commodity to be shipped is itself stronger than any crate that could be built around it, if the railroad rules call for a crate, there is no such thing, as there is with the truck carrier, of tempering the rule with a little judgment.

Amongst other articles, our firm markets a great many automobile storage batteries. To ship these by rail unboxed would be unheard of; and no doubt there is considerable risk of breakage. But we have no record of an unboxed shipment being refused by a truck carrier. The importance of this can be appreciated when it is realized that the cost per battery for boxing is about 40 cents.

It is not intended to take issue with the value to the railroads of their rules. It merely is pointed out, as one more factor tending to attract the railroad's traffic over to the truck lines, that they are rules which the truck lines do not enforce.

In our experience, damage to truck shipments has not exceeded that to rail shipments.

While the matter of packing is important, the greatest element of superior service offered by the truck lines, and the one which it would seem the railroads could most easily meet, is late departure from point of shipment and early delivery at destination. From time immemorial, it has been the practice of most railroads to stop receiving freight at the depot between 4 and 4:30 P.M. Whether this is merely the preservation of a custom, or whether there is some controlling reason for it, is not readily apparent. But whatever the reason, in these days of short buying and rush shipments, it has been the cause of turning to the truck lines many shippers who otherwise would have been willing to patronize the rails.

Roughly, it is estimated that, from nearby markets, 30 per cent of our orders reach us by phone or wire too late in the date to go forward by rail, even if all other conditions were equal, because of this early closing restriction.

Any of the California truck lines servicing our firm will accept shipments at their depots or pick them up at our warehouse as late as 6:30 P.M. and considerably later than that if something a little special is requested.

A comparison equally unfavorable to the railroads is encountered at the point of destination. Assume that both the truck line and the rail car reach the city of destination at exactly the same hour. The truck shipments are ready for delivery, and are delivered, immediately upon arrival; while the railroad, what with the billing and revising and checking to be done, seldom can get their shipments ready for delivery in less than two hours after arrival. These are powerful factors in diverting traffic away from the railroads.

Summed up, the truck lines are taking freight away from the railroads because truck service is better and because truck rates are lower. While these conditions prevail to a far greater degree in California than we have found them in other parts of the country, they are rapidly spreading. If the railroads are going to do anything about it, it is none too early for them to start.

Railroads Can Get Back Fast Traffic

We honestly believe that if the railroads, by coordinating their rail service for the line haul, with motor trucks for collection and distribution, or by any other means, will come anywhere near meeting the inducements held out by the truck carriers, then the railroads can hold what traffic they have and to a very large extent recover what they have lost. But to do so they will have to make some almost revolutionary revisions in their rules, cut out a great deal of the red tape now

(Continued on page 732)

Light-Weight Diesel Engines*

Characteristics of modern power units of this type and efforts being made to adapt them to motor transport service

By O. D. Treiber

President, Treiber Diesel Engine Corporation, Camden, N. J.

THE Diesel engine has existed for about 30 years, with little development toward the light weight type. After the war, the need for economical engines for motor coach and motor truck service in Europe resulted in the development of some Diesel engines for this service. Many types of them are in service today and are more or less satisfactory. Among these are the Junkers two-cycle opposed-piston type, the Benz, the M.A.N., the Renault, the Morton and the Deutz. Reasonably light weight and low first cost are demanded of engines for this service.

To reduce the weight per h.p. of a Diesel engine, we must first increase the rotative speed; second, use higher strength materials and stress them more highly; and third, increase the mean effective pressure.

The limitations of high rotative speed are very similar to those of a gasoline engine, excepting possibly the limits imposed by the lag of ignition, and this lag is greatly varied according to a number of different conditions such as temperature of fuel and compressed air and velocity and fineness of spray. Reduction of weight by the advanced use of metals is also a problem somewhat similar to gasoline engine problems; but increasing the mean effective pressure is distinctly a Diesel engine problem, with a wide range of results under different conditions.

The old pros and cons of two-cycle versus four-cycle type assume greater significance. Both types have advantages and will be developed further, but in both types are found the difficult problems of securing high mean effective pressure and good thermal efficiency, and of keeping the maximum pressure within reasonable limits.

Up to 1920, the Diesel engine was built almost universally with high pressure blast-air for injecting the fuel. This method can be considered obsolete today for light-weight Diesel engines. Solid injection is now used successfully and will, in my opinion, remain as the standard method. However, a great number of solid injection methods exist, and they can be classed in two principal groups: First, the constant-pressure system and, second, the individual-pump system.

The constant-pressure system delivers a fine spray through a properly constructed spray nozzle. The individual-pump system may be used with either a fine spray or a coarse spray, depending on the type of nozzle.

Combustion chambers have been shaped in many ways, but all can be divided into two distinct classes, as plain or auxiliary. Each type has advantages and disadvantages, but no method is perfect or greatly superior to all others.

The auxiliary combustion chamber has advantages in that it permits greater turbulence, thus allowing a coarser spray; but it has greater radiating surface and prevents a complete union of the hydrocarbons with the oxygen early enough in the stroke for high expansion ratio. The thermal efficiency is not as high as is required for light-weight engines. The plain combustion chamber has the minimum surface and radiation is consequently at the minimum. With suitable turbulence and control of the fuel spray, the chemical union of oxygen and hydrocarbons can be controlled, to keep the maximum pressure within reasonable limits, and continued to completion early enough and fast enough to give reasonably constant pressure, resulting in high mean effective pressure.

However, the control of the spray and the turbulence is not so easy in small cylinders as in large ones. A coarse spray will travel from 200 to 400 ft. per sec., and a fine spray from 600 to 1100 ft. per sec.. Traveling at this velocity, the liquid fuel is liable to come in contact with the walls of the combustion chamber before it is gasified and its temperature raised sufficiently to form a chemical union with oxygen, unless it has a considerable distance to travel. Not much distance is available in small cylinders, and the spray will decompose and build up a sticky mass of carbon if it comes into contact with the walls of the chamber, the exhaust will be smoky, and the engine will have poor economy.

Pressures and Thermal Efficiency

Consideration of the limits of mean effective pressure and thermal efficiency will give us a goal to work toward. Exceptional indicator cards, taken on slow speed engines, indicate that high mean effective pressure has been accomplished. I have built large slow speed engines developing 100 lb. per sq. in. brake mean effective pressure from 0.40 lb. of fuel per brake h. p. hour, and other engines at 85 lb. per sq. in. brake mean effective pressure with fuel consumption of 0.37 lb. per brake h. p. hour, and maximum pressures not over 700 lb. per sq. in. It must be remembered that thermal efficiency and mean effective pressure go up as maximum pressure goes up. If the pressure is increased to 1200 or 1500 lb., the economy will be improved, but it will be at the expense of more highly stressed or heavier parts. To compare Diesel engine performance, we must know three things: Fuel consumption, mean effective pressure, and maximum pressure.

A number of engines embodying electric ignition and a special type of gas generator and carbureter have been built to utilize heavy fuel-oil, with some degree of success. A type of generator is now perfected which will gasify fuel oil without the usual carbon deposits; and the resulting gas, when carbureted, gives excellent economy at predetermined loads and speeds, but has very little flexibility and requires gasoline for starting.

* From a paper presented at the annual meeting of the Society of Automotive Engineers, January 23, 1930.

This fact coupled with the requirements of electrical ignition and a carbureter, complicates the engine and adds to its cost. Furthermore, the thermal efficiency is not as high as that of a self-ignition injection engine.

As to types of light-weight Diesel-engines suitable for mobile service, we have first to consider that engines must be produced cheaply, at something near the cost of gasoline engines. This requirement introduces a weight-limiting factor that is dependent upon foundry limitations. Truck and motor coach gasoline engines weigh from 10 to 18 lb. per h.p. It is possible but not economical to build them lighter. A Diesel engine for the same service should weigh not much more than the gasoline engine. A differential of about 15 per cent is to be expected, because of the higher pressures used; it is possible to restrict the increase in weight to this, provided mean effective pressures are equal.

We have developed a line of engines that weigh 15 to 20 lb. per h.p. They are rated at speeds of 1000 to 1200 r.p.m., although very satisfactory runs have been made on the test stand at 1500 and 1800 r.p.m. The heads are separate from the cylinders and are fitted with one inlet and one exhaust valve for each cylinder.

These valves are pocketed into the cylinder liner, to make possible large ports, ample water circulation and suitable location for the spray nozzle.

The camshaft is mounted in the cylinder-head. A Formica gear on the camshaft is driven by a pinion which is mounted eccentrically on the cylinder frame, together with a sprocket, and driven from the crankshaft by a roller chain. The chain also drives the pump shafts and has idlers for adjusting its tension.

Starting is accomplished by an electric motor, and a compression-relief is provided to reduce the starting torque. Force-feed lubrication is used throughout. Entering at the forward end oil passes through the entire length of the hollow crankshaft. Openings are provided for all bearings, and a gage registers the pressure on the furthermost bearing. A branch from the main feed-line leads to the hollow rocker-arm shaft and lubricates the rockers, cams and camshaft bearings.

Why Truck Lines Attract Traffic

(Continued from page 730)

attendant upon a rail shipment, and, above all else, undergo a general speeding up of a merchandise service which, in many instances, is now so far behind that of the trucks that it isn't even in the running.

To better service from the railroads, we believe the shippers certainly are entitled; but the pliancy of the truck rates which, especially in California, are attracting so much tonnage, we believe, is not a good thing either for the truck operator or for the shipper. It is doubtful whether the truck operators are making anything out of the bargains they offer; and the uncertainty of what transportation is going to cost or of what competitors are having to pay for it, certainly is demoralizing to the manufacturers or jobbers who, with a more stable, even though higher, freight rate structure, are on an equitable basis.

Anything the railroads, or any one else of equal reliability, can do to meet the situation as it exists will be welcomed by the shippers. And surely there must be some way to meet it. Two railroads in California and one in Texas have recently adopted a plan that holds promise of going far toward meeting the competition of the trucks. They give store-door collection and delivery service by coordinating their motor trucks at origin and destination with rail service for the line haul. This is a complete and excellent service. We use it whenever we can.

In a San Francisco paper this morning appeared this news item:

> Railroads are now transporting passengers from their door at home to the door of their destination.
>
> The Southern Pacific announced yesterday that passengers may buy tickets calling for taxicab service from their homes to the station and from the train to any door they choose at the end of their journey.

That's an idea; Store-door pick-up and delivery service for passengers; the co-ordination of rails and motor vehicles.

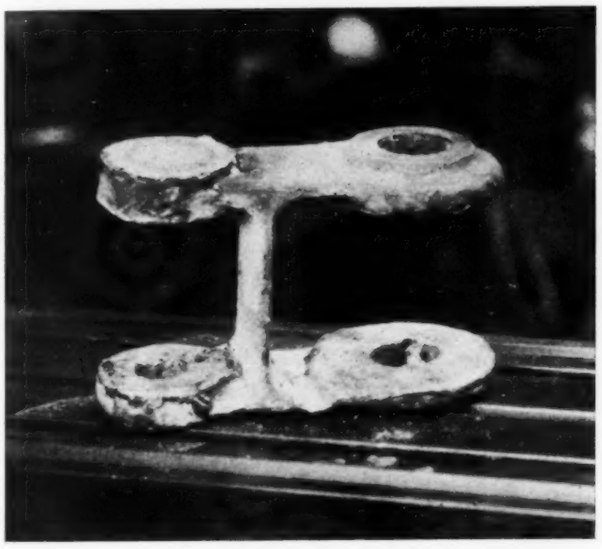
It is to be hoped the idea will spread.

* * * *

Brazing Spring Shackles

DUE to their exposed position, spring shackles are subject to considerable wear, and in time develop an amount of looseness which must be removed if quiet operation is desired.

Instead of junking these parts, the New England Transportation Company fills in the worn section with manganese bronze and then rebores and refaces the

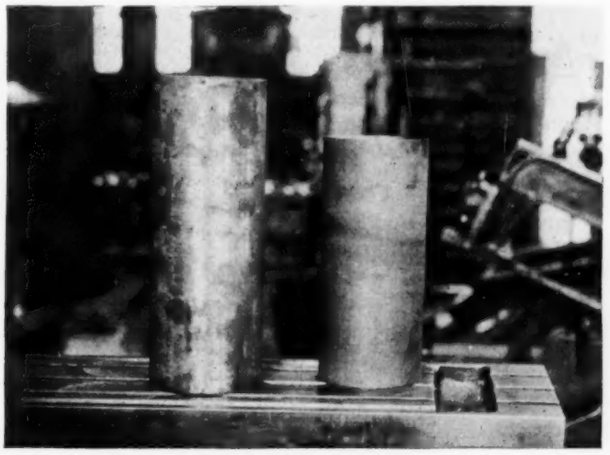


Spring Shackle Ready to be Machined Down to Size

shackle to the proper size. The piece is heated all over to a dull red. The surface to be brazed is then further heated by the acetylene torch to a cherry red and a flux applied, after which the bronze welding rod is used to build up the surface to more than its original dimension. This excess material is afterward removed in the machining process. Manganese bronze cuts easily after brazing and makes a good bearing surface.

Worn Cylinder Blocks Relined

IT is the practice of the New England Transportation Company to regrind cylinder blocks, which have become worn or scored, to 0.010, 0.020, 0.030, and 0.040 in. oversize, keeping all cylinders to the same diameter and fitting pistons and rings to the specified



A Rough and a Finished Cylinder Liner

oversize. The maximum oversize, beyond which the cylinder wall would be too greatly reduced for safety, is 0.040 in. When this oversize has been reached, the block is trued up and a sleeve is fitted in each cylinder with an allowance of 0.005 in. for press fit.

The inside diameter is finished by grinding and is left ten or twenty thousandths smaller than standard size. These sleeves have been found to give greater mileage without regrinding than a new cylinder block. The cost of labor and material for installing six reliners is estimated to be $40, while the cost of a new cylinder block, in which these reliners are commonly fitted, is $285

* * * *

British Motor Truck with Diesel Engine

New Equipment

Passenger and Express Body Built for Mack BK Chassis

A PARLOR motor coach body particularly designed for operation on routes which carry express shipments as well as passengers, has been developed by the Scott Body Company, Denver, Colo. Several of these bodies have been built for the Denver-Colorado Springs-Pueblo Motor Way and the Rio Grande Motor Way, highway subsidiaries of the Denver & Rio Grande Western.

The express compartment is located in the rear of the coach and is entered through a separate outside floor. The bodies have 21 and 25 passenger capacity, the express compartment in the 21 passenger body being proportionately larger than that in the 25 passenger body. The express compartment, below the windows, is lined with heavy duck and slatted with 2-in. by ⅜-in. ash slats. The windows are fitted with closely spaced metal bars to prevent breakage of the glass. Hand baggage can be carried, if necessary, on the roof of the express compartment. A heavy, two-bar railing extends around the edge of the roof to prevent loss, and a tarpaulin is permanently fastened to protect the baggage from rain and dirt. Hand baggage can also be carried in the passenger compartment in racks which extend over the seats. These racks are lined with carpet and edged with a heavy upholstered bumper rail for safety.

The body is built on an all steel base and the framework is made of seasoned ash, with all joints glued and screwed and well braced with forgings wherever necessary. The posts are through-bolted to steel gussets, which are braced in all directions and hot riveted to the steel base. All wooden members of the frame are covered with aluminum. The floor is of ⅞-in. laminated wood construction, covered with Tuco flooring which is dust-proof and will also withstand heavy wear. The windshield posts are made of steel and are securely attached to the roof and cowl.

Interior of Baggage Compartment

The outside of the body is covered with aluminum panels, with the joints covered with aluminum molding attached by screws. The inside panels are also aluminum and are covered with imitation leather.

The roof bows are made of ash, reinforced with steel and covered with ⅜ in. wood slats. To prevent rumbling, the roof is padded with coach wadding and

21 Passenger Motor Coach Body with Express Compartment in Rear

is covered with heavy canvas, which is painted with a special roof paint.

All side windows are fitted with railway-type latches and non-rattling spring guides. There are two front ventilating quarter windows and two curved glass corner windows at the rear. The front and rear doors are of the coach type with the front door operated by a mechanical, remote control opening and closing device. All seats are upholstered in genuine leather and have spring backs and seat cushions. An extra air spring pad is placed over the seat cushion for greater comfort. The driver's seat is of the bucket type and is adjustable. An individual mirror is placed on each body post between the windows, and dome lights are installed over each seat. For added attractiveness drape curtains are fitted to all windows in the passenger compartment. Ventilators are placed in the roof and cowl and an exhaust heater extends the full length of the coach.

The coach is fully equipped with stop and marker lights, a destination sign and a special, hand forged, heavy-duty tire carrier mounted on each side of the cowl. The entire body is finished in Duco and lettered in gold.

A.C.F. Announces a Small Capacity Motor Coach

THE new A.C.F. model 85 is a small capacity coach in which every unit has been designed expressly for use in this chassis. Not a single unit has been brought over from passenger car or truck building practice. Either a 21-passenger parlor or a 23-passenger street car type body are furnished with the chassis.

It has a six-cylinder, 80-hp. engine which develops a high torque at low engine speeds. In high gear this engine is said to be capable of accelerating the coach from 10 to 25 miles per hour in 15 seconds. It is supported on a 3 point mounting, with the rear supports made of rubberized fabric to prevent engine vibration from reaching the frame. Special aluminum alloy pistons are used, which have four piston rings. The cylinder block is a Nichrome casting which is integral with the crankcase. The crankshaft and connecting rods are made of chrome-nickel steel with bearings 2⅝-in. in diameter. A mechanical fuel pump is driven from the camshaft. The full-pressure oiling system includes a Hall-Winslow oil filter. The electrical system comprises a Leece-Neville, 12-volt, 350-watt generator, with external voltage regulation, a single ignition distributor and a Bendix-drive type starter. A 12 volt, 13 plate battery of 108 amp. hr. capacity is mounted under the coach and is accessible through an opening in the floor. A 14-in. Brown-Lipe, single-plate clutch is mounted in unit with the engine and transmission, with provision made for oiling of the release bearing.

The four speed, sliding gear transmission has ratios as follows: first speed, 5.35 to 1; second speed, 2.84 to 1; third speed, 1.76 to 1; fourth speed, direct, and reverse, 6.30 to 1. The main shaft and countershaft are mounted on Timken tapered roller bearings with outside adjustment. The gears have hardened and ground teeth and the case is made of cast iron.

The two-section, tubular drive shaft is supported by a self-aligning ball bearing at a frame cross-member. The Timken spiral-bevel-gear type rear axle has full-floating axle shafts and large diameter tubes pressed in to carry the wheel bearings. Lockheed internal expanding hydraulic brakes operate on all four wheels, with the braking pressure accentuated by a B.K. vacuum booster. The brake shoes are faced with woven fabric linings and are completely enclosed for protection against dirt and moisture. The shoes work against drums of special chrome-nickel cast iron, which gives smooth operation and long life. The total area of the service brakes is 475 sq. in.

Spoke-type steel disc wheels are demountable and interchangeable on all four wheels by loosening six studs. The standard tires are 34 in. by 7.50 in. pneumatic balloons, with duals on the rear wheels, with 36 in. by 8.25 in. tires available as special equipment which does not necessitate any change in the hubs or wheels. Houdaille double-acting, hydraulic shock absorbers control both the front and rear springs. The frame is made of pressed steel with fish-belly type side rails of 9 in.

The New A.C.F. 21-Passenger Parlor Car

maximum depth and 3 in. flange width. Four tubular cross-members tie the side rails to prevent twisting.

The tail pipe from the muffler extends to the rear end of the coach. Either an urban or parlor type body is furnished, properly streamlined, with ample seat spacing and full headroom. With the 185 in. wheelbase chassis, the parlor type carries 21 passengers and the urban type 21 or 23 passengers. These bodies are strongly constructed to prevent weaving, the thoroughly seasoned white ash frame being reinforced with encircling steel angles which extend around the roof ends. The steel wheelhousing is securely fastened to the belt rail and to the body pillars by steel gusset plates. strengthening the body sides at a point which is usually weak. All body panels are of aluminum, screwed on, with the joints covered by half-oval aluminum moulding. The windows are easily removable and are of the lift sash type. The rear window is fixed and has a metal awning. The stationary, one-piece, plate-glass windshield is mounted in rubber, and is permanently bolted to the steel frame at the front of the body. Inside metal baggage racks, lined with carpet, extend along each side of the body above the passenger seats. A Tropic-Aire hot-water heating system is standard with separate switches for the two circulating fans to permit the supply of varying amounts of heat.

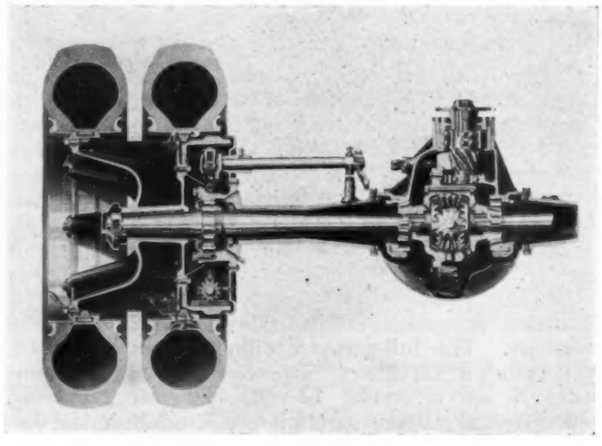
International Model A-5 Meets Fast Hauling Requirements

THE outstanding features of the new 3-ton truck recently announced by the International Harvester Company are a new six-cylinder engine, which has a seven-bearing crankshaft and removable cylinders; a single-plate clutch with built-in vibration damper; a new transmission with five speeds forward; a new spiral-bevel-gear drive rear axle; the latest type mechanical four-wheel brakes, and a heavy pressed-steel tapered frame. The increased demand for beauty of line has not been overlooked.

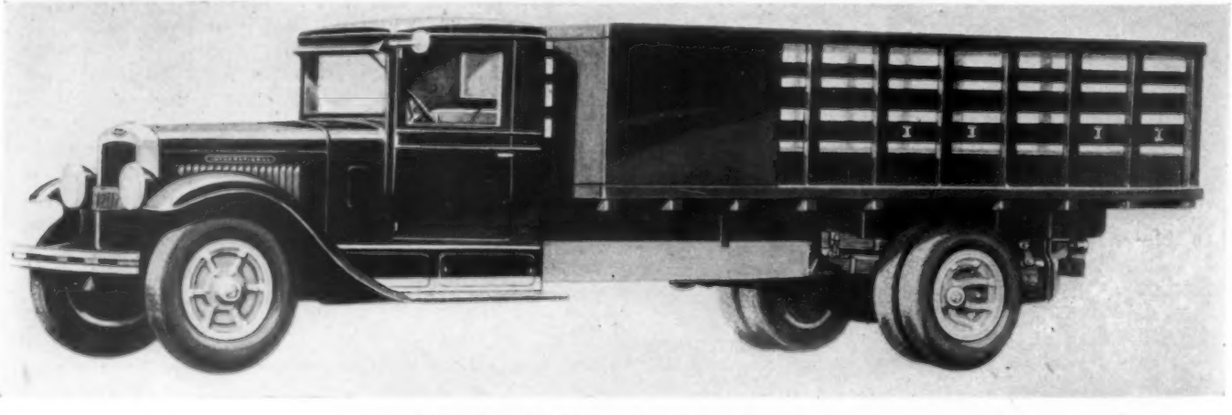
The model A-5 is built in three wheelbases: 156 in. for dump and semi-trailer work, and 190 in. and 210 in. for general hauling. A 2½-yard dump body of 9-ft. length may be mounted on the 156 in. wheelbase chassis. The two longer wheelbases provide for a body length back of the cab of 15 ft. and 17 ft. 6 in. respectively. The frame design provides the greatest depth from a point under the center of the cab to the front rear-spring hanger. Heavy channel-type cross members are gusseted to the side rails.

The engine, of International design and manufacture, is of the six-cylinder, valve-in-head type, and, with a 3⅝-in. bore and 4½-in. stroke, develops 65 brake hp. at its governed speed of 2800 r.p.m. The maximum torque, 165 lb. ft., is developed at 1100 to 1400 r.p.m. The engine has a three-point mounting with rubber-cushioned rear supports. The seven bearing crankshaft has a total projected bearing area of 32.57 sq. in.

Removable cylinders individually cast of close-grained gray iron permit the replacement of one or more without the expense of reboring. They are carefully machined all over to assure uniform thickness, which prevents uneven expansion and contraction. Force-feed lubrication is supplied, with the gear-driven oil pump supplying oil under pressure to all main, connecting rod, camshaft and rocker arm bearings. All lubricant passes through the oil filter. One of the interesting features of the lubrication system is the absence of pipes. After the oil passes through the filter, it is pumped through the hollow camshaft to the main and connecting rod bearings. An intermittent oil supply is forced through drilled holes in the cylinder block



Rear Axle Used in International 3-Ton Truck



International Model A-5 3-Ton Truck

and through a drilled cylinder head stud to the overhead rocker arms and push rods. The overflow returns to the crankcase through the push rod holes, lubricating the valve tappets on the way down.

The centrifugal water pump, attached directly to the cylinder head, delivers water from the radiator to the water jacket at the rate of one gallon per minute per horse power through the entire range of speed of the engine. On the spark plug side, the water is forced from the cylinder head downward through the cylinder block and around the cylinders, thus maintaining a uniform circulation. A thermostat is placed between the radiator and upper cylinder head to regulate the circulation and assure quick warming up of the engine in cold weather.

The 20 in. four blade fan is mounted on a double-row ball bearing and is driven by a heavy V belt. Battery ignition is regular equipment, but when required a high-tension magneto can be supplied at additional cost.

A 21 gal. gasoline tank is mounted under the seat. The carburetor is fitted with a wire-wool, oil-saturated air cleaner and a built-in velocity-type governor.

The 11 in. single plate clutch has a built-in vibration damper to eliminate the transmission of noise from the engine to the rear axle. A five-speed transmission operated with one lever, permits high speed for cross-country hauling while the four low-speed reductions provide increased pulling ability for hill-climbing and negotiating sand, mud or soft roads.

The spiral-bevel-gear driven rear axle has a straddle-mounted pinion, and the axle shafts are carried on straight and tapered roller bearings. Axle reductions of 7.16 to 1 and 6.43 to 1 are provided. Auxiliary rear springs are incorporated in the design of this truck.

The service brakes are of the internal expanding, self-energizing, two-shoe type, operating on all four wheels. Large diameter, high-carbon steel brake drums are machined to close limits and are secured to the wheels by large steel bolts. Cast spoke wheels, equipped with 34 in. by 7 in. pneumatic tires, dual on rear, are standard equipment.

Walden-Worcester Hub Cap Wrench

A WRENCH which will grip round or hexagonal hub caps, radiator and gas tank caps, water pump nuts and headlight rims, up to a diameter of 10 in., has been recently devised by Stevens Walden-Worcester, Inc., Worcester, Mass. The handle of this wrench is a chrome-alloy drop forging 11½ in. long, and the canvas strap, which is chemically treated to take a firm grip and to resist wear, is 34 in. long. A special swinging link automatically locks the strap on any size object within the capacity of the wrench. For extra heavy pulling, the strap can be held along the knurled handle to prevent slipping. The tool weighs 1¾ lb.

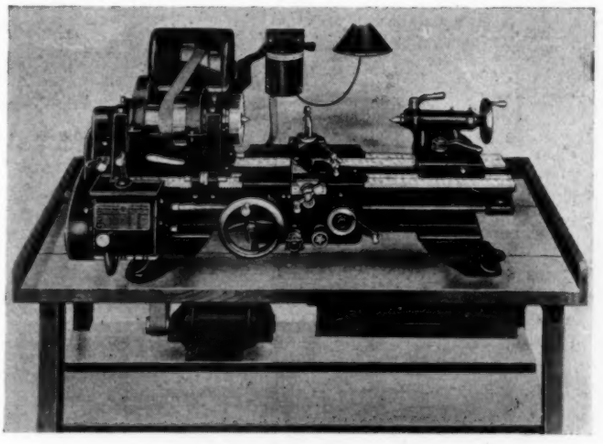
Hub Cap Wrench No. 457

South Bend Introduces a Small Shop Lathe

A BACK-GEARED, screw-cutting bench lathe, which will cut up to a diameter of 9 in. and between centers of 11 to 36 in., has been recently brought out by the South Bend Lathe Works, South Bend, Indiana. It will cut standard screw threads from 4 to 40 per inch.

The new lathe offers as its principal improvement an entirely new headstock of a style and design similar to that used on the large-size South Bend tool room lathes. The new headstock has a three-step cone of 1¼ in. width, which delivers 25 per cent more power than was possible on the earlier models. The same strengthening and bracing of the headstock casting by means of improved gear guards, has been adopted on this new lathe as on the larger models.

Another improvement includes provision for a new back-gear-shaft oiling system which protects the shaft



South Bend 9" Bench Lathe

from the harmful effects of neglect or careless lubrication. Easier and better oiling of spindle bearings is also provided, and the spindle carries a new seal that prevents accumulation of oil on the outside of the headstock.

The new gear guards, which strengthen the headstock casting, and the new method of securing the headstock to the lathe bed, insure a permanence of alinement of the headstock spindle which makes this lathe particularly adaptable to precision machining in the service shop. In this field it is adaptable as a universal precision tool for refacing valves, reboring connecting rods, finishing pistons, making bushings, and many other every day service shop jobs. The 9 in. lathe is an ideal tool for servicing armatures and truing the commutator. It is available with countershaft or with a horizontal belt drive and a ¼ hp. electric motor located under the bench. Attachments are furnished for doing special work such as milling and grinding, cutting tapers, etc.

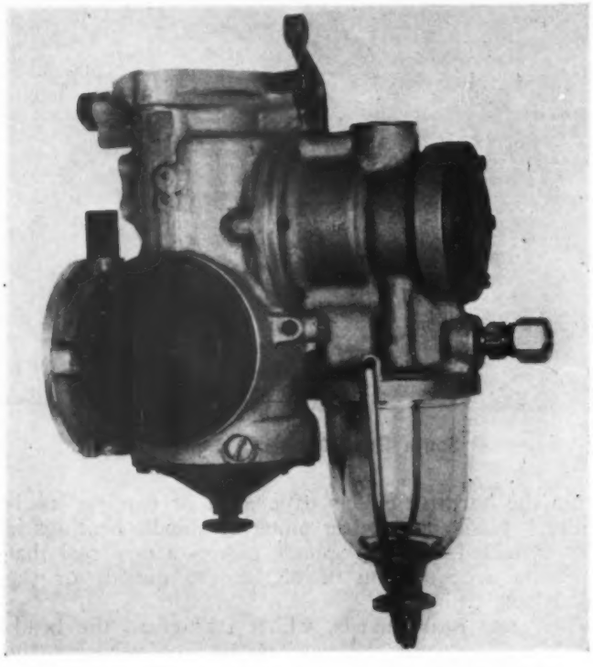
A metal index plate attached to each 9-in. Junior lathe shows the gear arrangement for cutting right or left hand threads within the capacity of the machine, including 11½-in. pipe thread. The change gears are also used for longitudinal feeds. The tail stock spindle is graduated and a micrometer collar is furnished on the cross feed and compound rest screws.

Stewart-Warner Electric Fuel Feed System

THE Stewart-Warner Corp., Chicago, has developed a system of fuel supply combining an electric fuel pump and a fuel filter with an improved carburetor, to form a single unit within which are performed all the functions of supplying an engine with fuel.

It is applicable without engine change of any sort, and its installation cost and labor involves only the mounting of a carburetor. Turning on the ignition makes the pump immediately operative and causes it to supply the carburetor with fuel at rates equal to the engine demand.

The electric pump discharges into an upper chamber in which are located the regulating contacts and the diaphragm, together with the spring which controls them. The pump automatically maintains a set pressure in this chamber, its value being determined by the strength



Stewart-Warner Carburetor and Fuel Supply Unit

of the upper diaphragm spring, which can be altered to suit requirements. Structurally, the filter and pump comprise a sub-assembly attached to the side of the carburetor riser. This construction facilitates possible inspection and servicing.

The electric contacts are operated submerged in the fuel, which tends to keep them cooled and washed. They are also protected from oxidation.

After passing through the filter, the fuel is made to pass a valve which seats in the same direction as the flow. This, with the pump at rest, completely seals the fuel outlet and prevents flooding or loss of fuel when standing down hill.

The carburetor portion embodies several features of design which make for maximum power output, strong response in all accelerations and low fuel consumption. All three of these features of performance have been closely inter-developed.

A C Heat-Range Spark Plugs

THE A C Spark Plug Company, Flint, Michigan, have recently introduced a line of heavy-duty, long-life spark plugs in the 7/8-inch regular and metric sizes, which are designed for buses, trucks and railway gasoline driven engines. The new heat-range spark plugs are graded from the hottest to the coldest

AC Spark Plugs Graded According to Heat Range

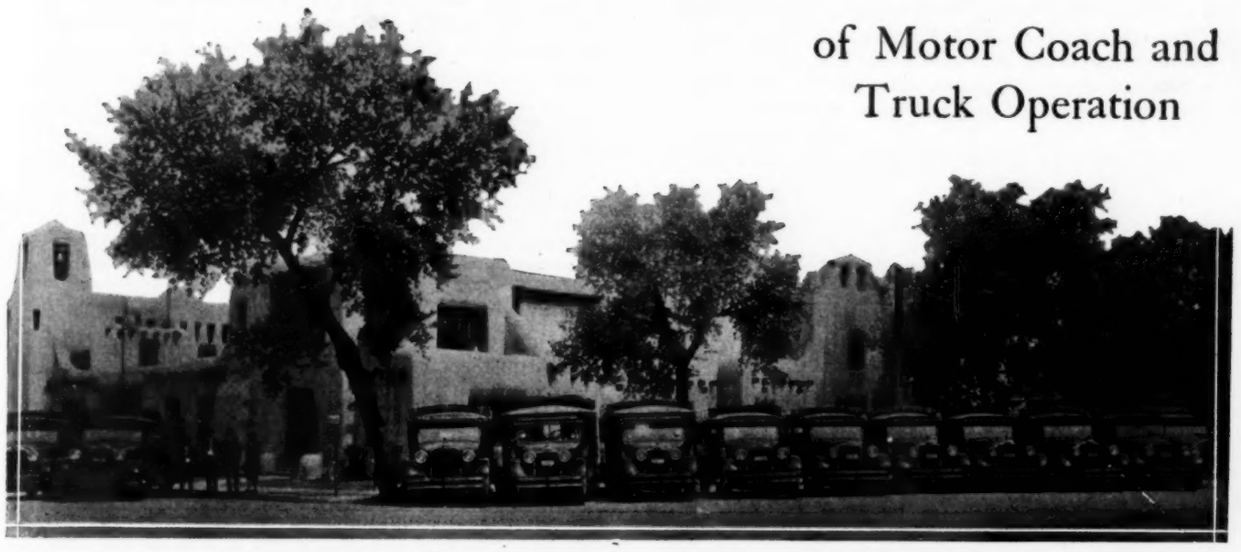
and provide a plug to meet all engine operating conditions. When an engine is continually operated at an extremely fast speed the spark plug insulator may become too hot causing rapid burning away of the electrodes and pre-ignition of the gasoline mixture. On the other hand, when operated at extremely slow speed, under unusual conditions, the spark plug insulator may operate at too low a temperature with a consequent tendency to become coated with carbon. The heat-range system, which is based upon the length of the insulator which is exposed to the combustion temperature, makes its possible to correct these problems by selecting a plug which either short or longer insulation to meet the particular condition. An improved electrode alloy is used in these spark plugs which, it is said, requires approximately 50 per cent less voltage to produce a spark, permits easier starting in cold weather, lasts longer and minimizes the need for gap adjustments. Other features of the new spark plug are: a welded side-wire electrode, which has better electrical and heat conductivity, and an improved one-piece construction, with the use of solid copper gaskets to insure against compression leakage.

* * *

New England Motor Coach Converted into a Truck

Every-Day Problems

of Motor Coach and Truck Operation



This Month's New Questions

Question No. 20

Operating Trucks in Freight Service

"What kinds of freight train service have you found it profitable to replace with motor truck service? Have definite economies or increased traffic resulted from such substitutions? Is store-door collection and delivery provided; if so, is an additional charge made? Have shippers paid this charge without objection? At rates comparative to rail rates, can l.c.l. freight be handled by motor truck at a profit?"

Question No. 21

Large or Small Motor Coaches

"What considerations are involved in determining the seating capacity of the motor coaches assigned to any route? What difference has been found in the cost of operation of 18-20 passenger equipment and that of 29-33 passenger equipment? From the standpoint of traffic development, is it preferable to run two smaller coaches with double frequency of schedules rather than one larger coach? If so, is the extra traffic secured sufficient to justify the extra cost? Do you anticipate a trend in the future toward larger or smaller motor coaches?"

What Is Your Answer?

Reply to Question No. 15

Disposing of Worn-Out Equipment

"When motor coaches have been worn out or have had to be retired from service for other reasons, what is done with them? To what extent is an attempt made to modernize old equipment? Is this worth while? If old equipment is junked, is an effort made to salvage any parts? Are these worth the expense of reclamation? What is your experience as to the actual life of the average motor coach in terms of miles?"

Reclamation Worth While

In the past, we have traded old motor coaches in on new equipment and have sold some for other uses. In case the chassis is in fair condition, we have reconditioned it and rebuilt the body, installed new seats and upholstery. So far we have found this very satisfactory and worth while.

We have only salvaged one motor coach, which was wrecked in a collision. The motor, transmission, differential and all other parts that were in good shape were salvaged, and some of the parts have been used. It was well worth the labor of reclaiming the material.

We find that motors need rebuilding at about 100,000 miles, transmissions at 80,000 miles, differentials at 135,000 miles, steering gear overhauled at 40,000 miles. The bodies last about 3½ years. The wood in the bodies then becomes dry rotted and has to be replaced.

J. DICKSON,
Superintendent of Motive Power, Spokane, Portland & Seattle.

Reply to Question No. 16

Obtaining Competent Mechanics

"Are you able to secure competent mechanics who can be depended upon to turn out the high grade work demanded in motor coach maintenance? Do you train these men yourself, or is previous experience demanded and found adequate? If you train them yourself, of what does the course of training consist? What kinds of previous training and experience have been found most useful? What has been your experience with mechanics fresh out of automobile schools? Does their training help them to become good mechanics?"

Too Much Previous Training Undesirable

We find that mechanics with too much previous training are undesirable, but that young men, mechanically inclined, who are anxious to learn the trade and willing to stick, turn out to be much more thorough in their work than the so-called skilled mechanic. Training consists of approximately three years starting from the inspection pits.

Some are inclined toward specialty work, such as electrical, welding, etc., and are encouraged and trained in the work in which they show the most interest. We have had no experience with automobile school mechanics.

FRANK J. HORN,
Superintendent, Santa Fe Transportation Co.

Replies to Question No. 18

Trends in Operating Costs

"Do you find that your motor coach operating costs in general are increasing or decreasing? What is your present average cost per mile and what was it a year ago? Please state items included. What factors are responsible for the change, if any? Have certain expenses tended to increase while others have decreased? If so, which are going up, and which coming down? What future changes in the level of motor coach operating costs do you anticipate?"

Reading Costs Show Little Change

The operating costs per mile of the Reading Transportation Company for the year 1929, as compared with the year 1928, reflect an increase of $.0001.

The average cost per mile in 1928 was $.2412, while in 1929 it was $.2413. Following are the items included in the makeup of this cost per mile figure, showing the increase and decrease for the year 1929:

	Per Mile
Maintenance of Plant and Equipment	.0037
Depreciation	
Traffic	.0044
Transportation	.0030
General	.0037
Taxes and Licenses	.0008
Insurance	.0022
Miscellaneous	.0001
Total Increase or Decrease	.0001

As a matter of pertinent information, these figures are based on the operation of the following equipment:

No. of Motor Coaches	Seating Capacity
8	21
2	25
22	29
20	30 or more

The increase in maintenance expense was due primarily to the age of the equipment, a few of the units having reached the general overhaul period during 1929. The traffic expense increase was due largely to additional advertising and changes of schedules. The decrease in transportation and general expenses was due largely to increased efficiency.

We anticipate a slight upward trend in operating costs per mile in the year 1930, due primarily to increased license fees and taxes, principally in the state of Pennsylvania, and to the age of our equipment, which will necessitate complete overhaul of practically all equipment during this year.

A. C. TOSH,
Superintendent, Reading Transportation Co.

D. & R. G. W. Costs

On the Denver-Colorado Springs-Pueblo Motor Way, the average operating cost per mile for the year 1929 was 22.36 cents, compared with 22.85 cents in 1928, practically all of the decrease being in supervision costs due to expansion of territory, partially offset by increased cost of repairs to older equipment. Otherwise the unit costs remained about the same.

On the Rio Grande Motor Way, the average cost of operations in 1929 was 27.27 cents, compared with 21.07 cents in 1928, due entirely to increased size of equipment and reduction in mileage, without proportionate reduction in supervision and station expense. The increased size of equipment naturally increased the unit cost for repairs, gasoline, lubrication, etc.

On the Western Slope Motor Way, the average cost in 1929 was 25.53 cents, compared with 22.94 cents in 1928, due to reduction in mileage and increased size of equipment, which increased the unit cost for supervision, station expense, etc., with a natural increase in cost of gasoline, lubrication and repairs.

There has been no particular trend in costs in our operation, there having been manifest reasons for the increased unit costs in practically every instance.

F. A. PEIL,
Assistant to President, Denver & Rio Grande Western.

Motor Transport NEWS

Agreement with Coach Line Entered by P. R. R.

The Public Service Commission of New York recently approved an optional arrangement whereby the Pennsylvania Railroad and the Buffalo Interurban Bus Lines, Inc., will co-operate in the handling of certain classes of passenger traffic.

The arrangement, which becomes effective March 27, provides that 10-trip three-months tickets, 60-ride monthly and 46-ride monthly school tickets, issued by the Buffalo Interurban Bus Lines will be honored on trains of the Pennsylvania between stations corresponding to those to which the motor coach tickets are issued.

Contract Relationship Held To Be Fictitious

Pennsylvania commission orders discontinuance of truck service

Holding that the claimed contractual relationship of Harry R. Robinson, motor truck operator, with his patrons was fictitious and was "entered upon to evade the effect of reasonable orders of this commission," the Public Service Commission of Pennsylvania, in a recent order, directed Robinson to discontinue his operations between Pittsburgh and Burgettstown in the absence of a certificate of public convenience and necessity.

The complaint against Robinson, according to accounts published in a Harrisburg dispatch to the United States Daily, was filed by the Pennsylvania Railroad and the Railway Express Agency, Inc. These complainants alleged that the respondent was operating a common carrier freight service without having procured the required certificate.

"The record adduced," the commission's order states, "indicates that respondent operates from an establishment in Pittsburgh known as the Local Union Express, at which point some 48 truck operators have their headquarters. The persons in charge of the establishment receive the merchandise and requests to call for goods to be shipped into the territories reached by the several carriers operating from this office and in general maintain a freight receiving station for them. All but two or three of these operators are

(Continued on page 747)

Combination Rail-Highway Service on Pennsylvania

Operations, to be conducted by railroad in co-operation with Greyhound Lines, will be inaugurated on April 1

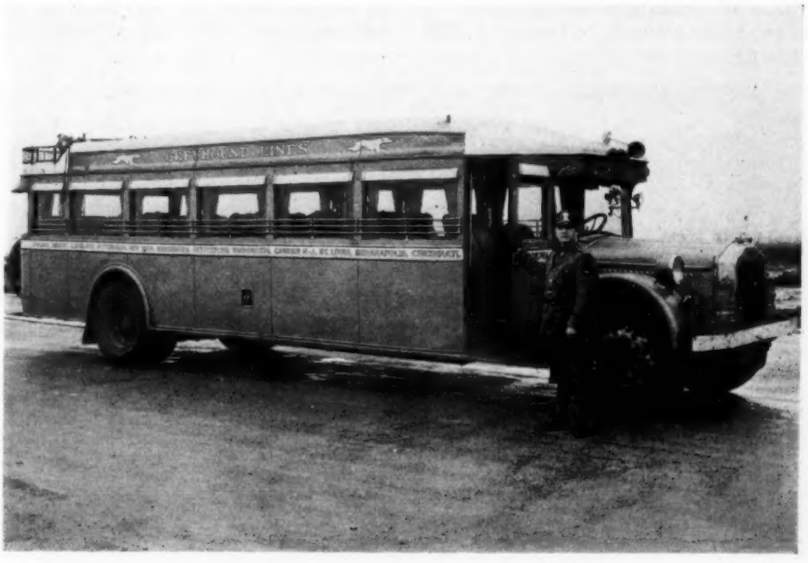
Combination rail and motor coach service between New York and Chicago and St. Louis and between Philadelphia and Chicago and St. Louis will be inaugurated on April 1 by the Pennsylvania in co-operation with the Greyhound Lines, trans-continental highway operating company in which the Pennsylvania is financially interested. In addition to the termini named the combination service will be available between all intermediate points along the route.

The announcement states that the launching of the plan "will constitute a distinct innovation in long-distance passenger transportation in the United States. The cardinal feature of this joint through service" it adds "will be that long-distance travelers will have the privilege of enjoying motor coach travel during the daylight hours, with the comfort of Pullman cars for the night portions of the journey." The service in both directions will involve a daylight motor coach ride at each end of the journey with an intermediate train ride during the night hours.

The combination rail and motor coach fares for the through journeys average about $8 less than the total of rail and Pullman fares on regular (non-extra fare) trains between the same points. The schedule of through fares is as follows: New York to St. Louis, $37.06; New York to Chicago, $32.18; Philadelphia to St. Louis, $28.97; Philadelphia to Chicago, $28.48. Fares between New York and St. Louis and New York and Chicago are the same in both directions whereas the eastbound fare between St. Louis and New York is $30.88 and between St. Louis and Philadelphia $29.98.

Comparable all-rail fares between the

(Continued on page 748)



Greyhound Lines Long-Distance Motor Coach

Parker Interstate Regulation Bill Before the House

The Parker Bill for the regulation of interstate motor coach lines was reported favorably in the House of Representatives on February 27, by the House Committee on interstate and foreign commerce. Consideration of the measure, to be known as the Federal Motor Carrier Act, 1930, commenced on March 12 when Representative Parker of New York, the author, opened the debate with an explanation of the bill's provisions. Some amendments were made by the House and passage was expected to follow during the week of March 16.

The bill was reported in the house as H.R. 10288 and includes many changes from H.R. 7954 on which public hearings were held by the Committee on January 8 and 9 (see *Motor Transport Section* of January 25, page 295). Subsequent to these hearings a bill, designated H.R. 10202, was introduced by Representative Parker on February 22 only to be superceded on February 26 by the introduction of H.R. 10288 on which a favorable report was made February 27, the day following its introduction. This favorable majority report was accompanied by a minority report signed by Representative Huddleston of Alabama.

The most important changes which the reported bill made in provisions of the pending measure for which it was substituted deal with the administrative features and the date of the so-called "grandfather clause." This latter as reported in the *Motor Transport Section* of February 22, page 539, now carries the date of January 1, 1930. This clause now reads:

"If the corporation or person making application for a certificate of public convenience and necessity sets forth therein that it or any predecessor in interest was operating as a common carrier by motor vehicle in interstate or foreign commerce on any public highway on January 1, 1930, and claims the benefits of this subsection, the commission upon receipt of such application shall serve such carrier with a questionnaire in respect to the matters on which the commission may require information. The applicant shall answer the questionnaire within forty-five days from the receipt thereof. A copy of all questionnaires and answers thereto shall be furnished by the commission to the board of every State in which any part of the operations of the carrier are conducted. If it appears from the answers to the questionnaire or from information otherwise furnished, (1) that the carrier or a predecessor in interest was in bona fide operation on January 1, 1930, as a common carrier by motor vehicle in interstate or foreign commerce on any public highway and (except as to seasonal service or interruption of operations over which the applicant or its predecessors in interest had no control) continuously has so operated since that date, and (2) that such operations are bona fide for the purpose of furnishing reasonably continuous and adequate service at just and reasonable rates, and (3) that the applicant is fit and able properly to perform the service required, then a certificate shall be issued to the applicant by the commission without further proceedings; otherwise, the question whether or not such facts appear shall be decided in accordance with the procedure provided in section 3 (including reference to a joint board in a proper case), and the certificate shall be issued or denied accordingly."

The section under which railways acquiring motor coach lines are exempt from the provisions of the anti-trust laws is retained. It reads in part: "Any corporation or person to whom a certificate of public convenience and necessity is issued or transferred under this Act, shall be relieved from the operation of the antitrust laws, and from all other restraints and prohibitions of Federal or State law—in so far as may be necessary to enable such corporation or person to carry into effect the consolidation, merger, or acquisition as approved and to conduct the operations authorized by the certificate."

The changes in the administrative features are many. The first of the bills introduced following the public hearings (HR 10202) permitted the joint boards of the interested states to enter orders, which orders would be subject to review by the Interstate Commerce Commission. The reported bill, however, is altered throughout to reduce the effect of joint-board findings to recommendations for action by the Interstate Commerce Commission from which body all orders will issue. The committee report explains administrative features embodied in Section 3, as follows:

"Section 3: The general administrative scheme is set forth in this section. The commission itself will be primarily charged with the administration of the act. However, under this section the commission is authorized to act through individual members and examiners upon any matter, and, in case of any such matter involving operations by common carriers by motor vehicle in two States only, is required to refer the matter to a joint board of two members chosen as set forth in the act, if it concerns certificates of public convenience and necessity for new operations, rate complaints, consolidations, mergers, and acquisitions of control, complaints as to violations of safety requirements, or certain other specified matters.

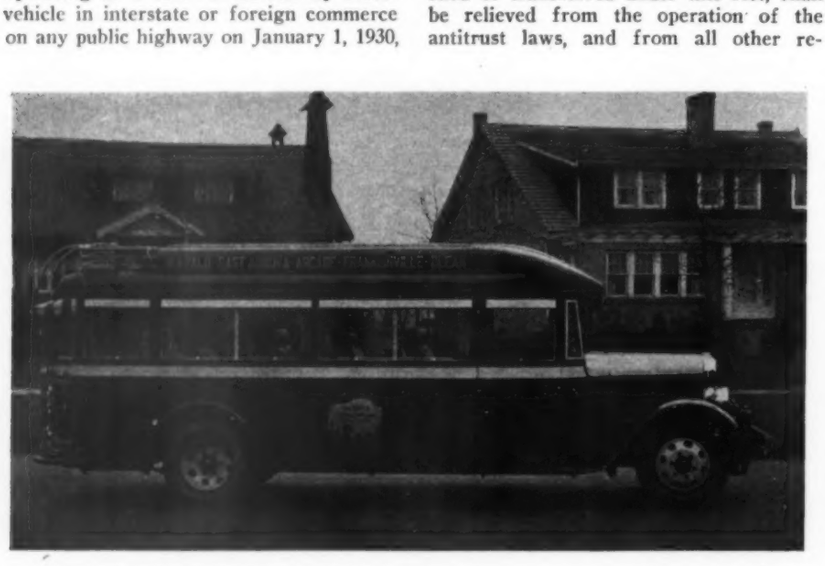
"Members of joint boards are to be appointed by the commission upon nomination by the State utility boards or by the State governors. The method of choosing the members of joint boards was adopted with a view to securing men conversant with local conditions and ex-

(Continued on page 748)

N. J. Bill Proposes Mileage Tax on Interstate Business

A mileage tax of one-half cent a mile on interstate motor coaches operating through New Jersey, is proposed in a bill recently introduced in the legislature of that state. The assessment would apply to those operators which do not pay the state's present five per cent gross receipts tax on their interstate business.

The bill was accompanied by a special report prepared by the tax survey commission. This stated that the proposed measure is modeled after a similar act which is in force in Connecticut and which has been upheld by the United States Supreme Court. The attempt of the 1927 New Jersey legislature to impose a tax on interstate motor coach traffic was declared unconstitutional by the New Jersey courts.



Motor Coach Operated by Buffalo Interurban Bus Lines with which the Pennsylvania Recently Entered Agreement

Court Refuses to Review Atlantic City Route Case

The Supreme court of New Jersey has denied the petition of the West Jersey & Seashore and the Atlantic City railroads, subsidiaries respectively of the Pennsylvania and the Reading, for writs of certiorari ordering a review by the court of the decision of the Public Utility Commission of New Jersey which permitted the Public Service Co-Ordinated Transport to operate a continuous motor coach line, with local stops, between Camden and Atlantic City (see *Motor Transport Section*, December 28, 1929, page 1508).

The order, of which the railroads sought a review authorizes the Public Service Co-Ordinated Transport to link up its motor coach service between Camden and Berlin and Egg Harbor City and Atlantic City with a short line operating between Egg Harbor City and Berlin.

Camden Stop Added on P. R. R. Atlantic City-Philadelphia Run

Motor coaches of the People's Rapid Transit Company, operating between Philadelphia and Atlantic City, now pick up passengers bound for Atlantic City at the Hotel Walt Whitman, Camden, N. J., according to a recent announcement of the Pennsylvania General Transit Company, the subsidiary through which the highway operations of the Pennsylvania are supervised. (The Pennsylvania owns a 75 per cent interest in the People's Rapid Transit Company.)

The announcement states that the service is provided only for through passengers between Camden and the Pennsylvania station at Atlantic City. Coaches leave the Hotel Walt Whitman at 8:25, 9:25 and 10:25 a.m., and 3:25 and 5:25 p.m. On Saturday and Sunday additional motor coaches will leave at 1.25 and 7:25 p.m.

Boston & Maine Receives New Hampshire Certificate

The Public Service Commission of New Hampshire has recently issued an order granting to the Boston & Maine Transportation Company authority to operate motor coaches in that state between Manchester and Milford. The present decision, which is a reversal of a previous order refusing the same permit, was made in response to requests from residents of the communities where the proposed line would operate.

The order provides that the Boston & Maine Transportation Company shall file sworn monthly statements showing the number of passengers carried and between what termini, the fares collected and the cost of operation. The company is restricted from doing a local business within the city of Manchester.

Ohio Commission Upheld In New York Central Contract Trucking Case

The Ohio Supreme Court, in a recent opinion, upheld the findings of the Public Utilities Commission of that State that the contractural relationship between the New York Central and the A. B. Peek Company, motor truck operator, constitutes the former "a motor transportation company" subject to the Ohio law requiring a certificate of public convenience and necessity. The findings of the commission in this case were reported in the *Motor Transport Section* of September 28, 1929, page 773.

The opinion of the court, in declaring the railroad company a motor transportation company, held that an order from the commission to cease and desist from a continuation of the business is not void as an impairment of the obligations of the contract between the carrier and the trucker.

The opinion opens with a review of the history of the case which arose upon a complaint filed with the Public Utilities Commission by the Ohio Association of Commercial Haulers against the New York Central. The complaint, filed March 28, 1929, and heard June 5, 1929, centered about the contract of the New York Central with the A. B. Peek Company, under which the latter agreed to handle l.c.l. freight by motor truck for the railway between Cleveland and Toledo, Ohio, and intermediate stations. The finding of the commission was that "the New York Central Railroad Company directly, or through the A. B. Peek Company, or any other agent not certified by this commission be, and hereby they and each of them are, notified, directed and required forthwith to cease and desist from maintaining and operating or attempting to maintain and operate said unlawful motor transportation company service."

Excerpts from the court decision follow:

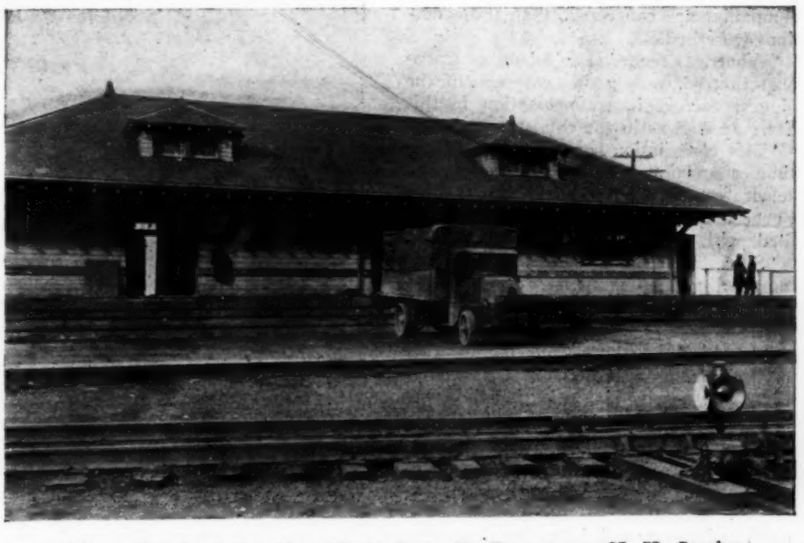
"This proceeding is not a proceeding to decide whether a private contract operation by the Peek Company has become a common carriage operation. The sole question presented is whether the New York Central Railroad Company constitutes a motor transportation company because of its common carriage operation in motor-propelled vehicles upon the public highways of the State. This being the case, the complainant has standing, and the complaint is authorized, for the statute which provides for the institution of complaints against motor transportation companies is not limited, but applies to any company or corporation.

"The issue presented for the determination of the commission was whether the New York Central Railroad Company, at the time charged in the complaint, owned, controlled, operated or managed any motor-propelled vehicle used in the business of transportation of persons or property or both as a common carrier for hire, over any public highway in this State....

"It is conceded by the public utilities commission that the railroad company does not own nor operate such motor-propelled vehicles, but it was found by the commission specifically that the railroad does control and manage the vehicles. . . .

"It is conceded by the railroad company that while it does not own the trucks and trailers, it selects the property which shall be conveyed in the motor vehicles, it picks out the routes which shall be traveled and indicates the times and schedules under which the vehicles shall travel. Complete supervision of the operation is in the New York Central Railroad Company. The trucks are used exclusively for the railroad, and at every minute of the time of carriage the property transported is under the railroad's control, being handled

(Continued on page 749)



Motor Truck at the New York Central's Tarrytown, N. Y. Station

Investigation of Rates Ordered in Michigan

Probe to cover also other practices of motor coach lines

The Public Utilities Commission of Michigan has issued an order for an extensive investigation into the rates, practices and service of all motor coach companies operating in that state, according to a recent dispatch from Lansing, Mich., to the United States Daily. The investigation will include a series of public hearings to be conducted by the commission throughout the state.

Robert H. Dunn, chairman of the commission, issued the following statement in announcing the order:

"By virtue of the powers conferred upon it by Act 209 of 1923, the Michigan public utilities commission has had jurisdiction over all motor bus and truck operators in the State of Michigan, except where such operators' activities were wholly within the corporate limits of cities.

"From time to time since that date this commission has published certain rules and regulations applicable to the conduct of bus and truck companies, but it has never concerned itself with the rates charged by bus and truck operators other than to see that the rates were filed with this commission and that the rates were not discriminatory and were not illegal rates.

'Since 1923 the number of bus and truck companies has multiplied many times. Now in Michigan, as in other States, the bus operators are undoubtedly carrying as many passengers as are the railroads of the State, perhaps more.

"Since 1923 operating conditions have changed considerably in Michigan. Hundreds of miles of hard surface road and the activity of the State highway department in keping these roads open have made operating conditions in this State much different, as far as bus and truck companies are concerned, than the conditions were in 1923.

"What was regarded as a baby in transportation has now grown into one of the biggest factors in transportation in this State as well as in the country.

"This commission has had from time to time complaints on fares charged and service rendered by certain bus operators. Several of these complaints have been filed with the commission recently.

"Since we have these complaints, and inasmuch as the bus industry is of the size it is and to all intents and purposes increasing in size and volume of business conducted, this commission feels, as its order indicates, that the time is now here for an extensive investigation into the rates, charges, fares, practices and services of the bus operators of the State of Michigan under the jurisdiction of the Michigan public utilities commission.

"This investigation will be very thorough in its scope and, following this order, a special order will be issued setting a time and place for the first of a series of hearings.

"This special order will, undoubtedly, be accompanied by a questionnaire conveying to the receiver of such the ideas along which this commission intends to proceed during the hearings and indicating the data that it wants presented before it.

"We are not charging or intimating that the present service is not good. We are not charging or intimating that the present rates are too high. In fact, we are taking no position except that of an investigator, who, having received complaints of different nature, desires to know the true condition of all affairs connected with the operation of common carrier motor vehicles for hire on the highways of the State of Michigan.

"We do not know what action of the commission will follow this investigation, but there undoubtedly will be some action resulting from a general and thorough investigation.

"We feel that this ex parte proceedings will result in good for the people of the State and for the operators as well, and that better service and a better understanding of operating conditions and of what is necessary to produce good service cannot help but result from the proceedings that will be had following this order of the commission."

Insurance Commission Rejects Underwriters Proposed Rates

The State insurance board of Oklahoma has rejected an increase in rates for public liability, property damage and collision insurance promulgated by the National Bureau of Casualty and Surety Underwriters, for motor coach and motor truck operators in Oklahoma.

The underwriters proposed to require operators, serving two or more territories taking different rates, to pay for the entire line the rate applicable to the most hazardous territory touched.

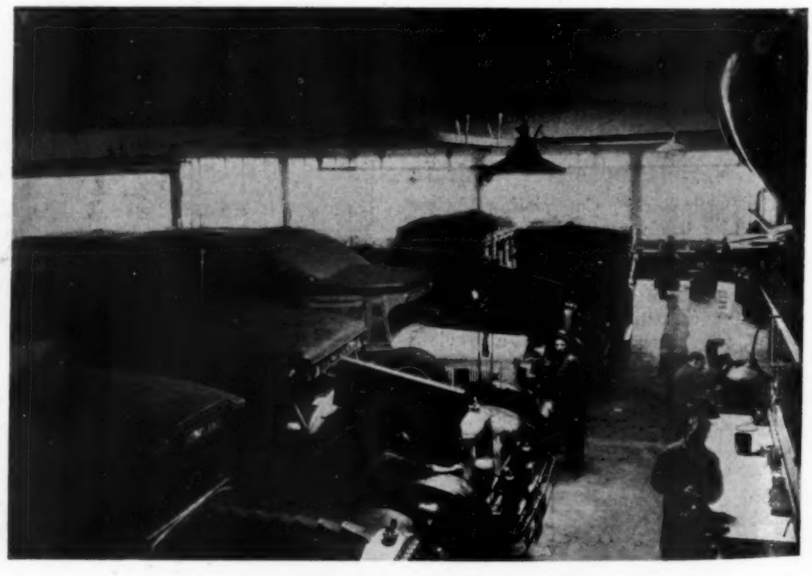
Reading Motor Coaches Earned Profit in 1929

Report shows increase of 364 route miles during year; total now 593

The annual report of the Reading Company, made public on March 3, states that the service performed by the Reading Transportation Company, the Reading's highway subsidiary, continues to be economical and satisfactory.

"After depreciation of its equipment in accordance with the best modern practice, and the payment of all other charges," the statement continues, "the Reading Transportation Company showed a net profit from its operations for the year 1929. In addition thereto, considerable savings were effected by the Reading Company through the withdrawal of unprofitable train service on some of its outlying branches and the substitution of motor coach service therefore commensurate with the necessities of the traveling public."

The report further reveals that the mileage of highway routes in operation at the close of 1929 totaled 592.6, an increase of 363.8 route miles over the 228.8 in operation when the 1928 annual report was compiled. The longest of the new routes is the 184.6 mile run between New York and Harrisburg, Pa. This is operated by the Reading Transportation Company and the Jersey Central Transportation Company, highway subsidiaries of the Central of New Jersey, and was inaugurated on December 9, 1929, (see *Motor Transport Section*, December 28, 1929, page 1531). Other new routes are Philadelphia to Pottsville, Pa., 90.9 miles; Philadelphia to Atlantic City, N. J., 62 miles, and Lebanon to Pine Grove, Pa., 26.3 miles. At the close of 1929, 52 motor coaches were in operation while 880,375 passengers were carried in highway service during the year.



View of Oregon Stages Repair Shop at Portland, Ore.

Express Agency Seen As Freight Trucker

N. Y. Traffic Club speaker cites possibilities in present national organization

Although specifically advocating a trial of store-door collection and delivery of freight only in a designated section of Manhattan Island, New York City, George F. Hichborn, general traffic manager, United States Rubber Company, in a recent address before the Traffic Club of New York nevertheless continued to observe that "following through the thought of national delivery service as an accessorial carrier service, the carriers now own and operate the Railway Express Agency, Inc., with its large fleet of trucks and experienced personnel.

"It is reasonable to assume," Mr. Hichborn continued, "that it (the Railway Express Agency) can, as need arises, quickly expand this service by adding to present equipment when and where found necessary. It would then be possible for the vehicles to be used jointly in express and freight cartage service, always under the direction of carriers, thus reducing to a minimum the expense entailed, with a maximum service to shipper and carrier—at least as far as delivery of inbound package freight is concerned."

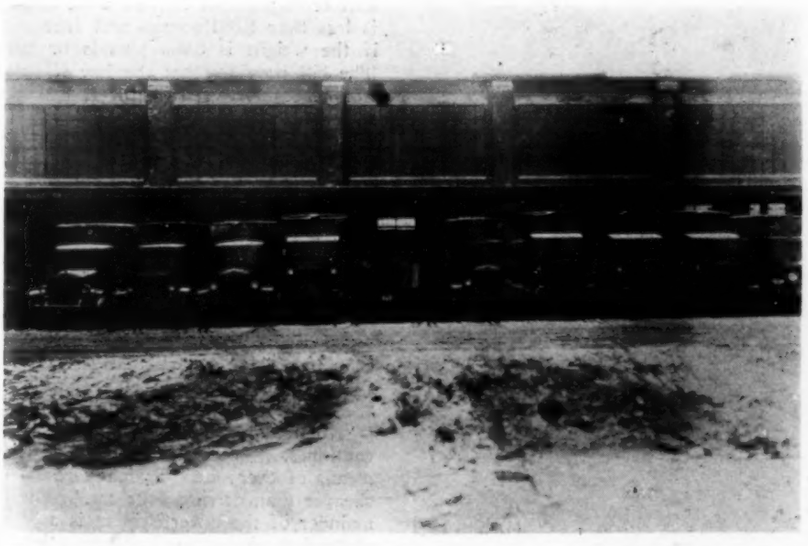
Mr. Hichborn opened his address with review of past proposals for store-door service in Manhattan and an outline of developments leading to the discontinuance of "constructive station" service (see *Railway Age* of August 24, 1929, page 467). This review included also a survey of store-door service at St. Louis, in Canadian cities and in England.

In making specific recommendations for a trial of the service in Manhattan the speaker said:

"In making a study of present freight handling conditions in areas scattered throughout the metropolitan district, it will be found that the district south of Sixtieth street, Manhattan, presents the area of greatest congestion because ramifications of the freight terminal handling problem that are found anywhere in the district are all present in this one area in their most aggravated forms. It, therefore, seems logical that this area or zone should be selected to inaugurate direct pick-up and delivery service, since conditions for its success are most favorable here. If after a fair trial it is found practicable, it may be extended to other areas of the metropolitan district.

Undoubtedly the ideal method for handling domestic freight on Manhattan Island would be a store door delivery and pick-up service operated by the carriers as a carrier service under a special drayage charge fixed in their tariffs. Indeed, such a national delivery service conducted as an accessorial carrier service throughout the country, commencing at the store door of the consignor and ending at the store door of the consignee, with appropriate special charges for drayage, would co-ordinate the drayage with the railroad service and give a continuous movement under one responsibility and control from the premises of the consignor at the point of origin to the place of business of the consignee at the point of destination. Besides being desirable on general grounds such an uninterrupted service from store door to store door would eliminate many of the terminal troubles and difficulties now encountered. Ultimately the carriers as a mere matter of efficiency will doubtless wish to undertake such a service. * * *

"When direct delivery and pick-up service is started, it should, in my judgment, cover both carload and less than carload freight. This service may be optional on carloads. It should be optional on less than carload lots, only until such time as the service is definitely and successfully established."



Trucks of Railway Express Agency at the New Haven's New York Terminal

Greyhound Corporation $4,000,000 Financing

Three-year notes, to yield 6⅜ per cent, carry also stock purchase warrants

A syndicate composed of the Foreman-State Corporation, Lane, Piper & Jaffray, Inc., and the Northern National Corporation, on March 4, advertised an offering of $4,000,000 three-year six per cent collateral trust notes of the Greyhound Corporation. Each of the $1,000 notes carries a warrant entitling the holder to purchase 10 shares of Greyhound Corporation common stock at $15 per share on or before March 1, 1931; at $17.50 per share thereafter until March 1, 1932; or thereafter at $20 a share until March 1, 1933; at which latter date the notes are due. The notes are offered at 99 per cent of principal and accrued interest or to yield 6⅜ per cent to maturity.

A letter of O. S. Caesar, president of the Greyhound Corporation, is summarized in the advertisement. This letter reveals that "Stock of the Greyhound Corporation, representing control of the Corporation, is owned by the following: Automotive Investments, Inc., Pennsylvania Railroad Company, Southern Pacific Company, Insull interests, Goldman Sachs Trading Corporation and the officers and directors of The Greyhound Corporation. The management of the Corporation is in the hands of men who have operated bus lines since 1915."

The Greyhound Corporation's subsidiaries are described as operators of "practically all of the important long distance bus lines in the territory between Chicago and New York. "In 1929," the letter continues, "the Corporation acquired substantial minority interests in bus companies operating in other sections of the United States, with which companies it has advantageous operating arrangements regarding the interchange of passengers at connecting points, the co-ordination of schedules, group purchasing of equipment and supplies, and the use of the common designation, Greyhound Lines. The Greyhound Lines form the largest bus transportation system in the United States, serving most of the important cities in the country on daily schedules."

The proceeds of the notes will be used to refund maturing indebtedness, to reimburse the treasury for capital expenditures in the acquisition of new properties and to provide additional working capital. Upon the completion of the present financing the note issue will be the Greyhound Corporation's only funded debt obligation.

Consolidated net income of the Greyhound Corporation and its present subsidiaries available for interest and Federal income tax, after deducting depreciation of $700,669 and eliminating profit from sale of bus lines or interests therein, for the year ended December 31, 1929, is set forth in the advertisement as $1,549,964.

New England Transportation Co. 1929 Operating Results

The New England Transportation Company, highway subsidiary of the New York, New Haven & Hartford reported a deficit of $66,142, for 1929 but the annual report of the parent railroad in commenting thereon says that "the combined results to the Transportation Company and the New Haven from motor coach operations co-ordinated with rail service were most satisfactory." The deficit, which compares with a 1928 net income of $108,252, is attributed to the falling off in motor coach passenger revenues during the latter part of the past year.

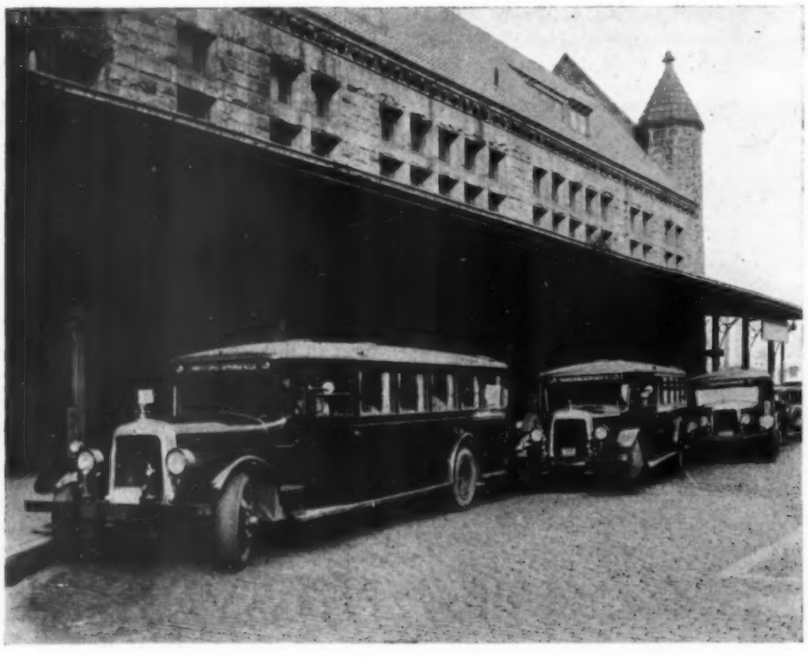
Despite this latter, however, total passenger revenues for 1929 were $2,924,753, an increase of $59,933 over the 1928 passenger revenue figures of $2,864,820. In addition, the New England entered the freight trucking business during 1929 and for this service, inaugurated about the middle of the year, gross revenues of $101,442 were reported. Other operating revenues declined $20,998 but the increase in gross operating revenues over 1928 was $140,377. In connection with the freight trucking operations the report states that 90 trucks are in service on 50 different routes. "It is believed that this will not only increase the freight movement but will provide speedier and more economical service" it adds.

Operating expenses for 1928 totaled $2,890.630, an increase of $259,961 over the 1928 expenses of $2,630,669. All classes of operating expenses increased as compared with the previous year except maintenance of way and structures which declined $737. Increases were: Maintenance of equipment, $131,725; transportation, $114,885 and other expenses, $14,089. Taxes rose $48,222 and non-operating income $3,171. The operating ratio was 90.29 per cent, an increase of 4.35 per cent over the previous year. The balance sheet lists total assets of $5,209,394 of which $4,699,634 is represented by investments. The New Haven owns the entire capital stock of the New England, amounting to $1,500,000, and has an additional investment of $1,368,500 in notes of the subsidiary.

Ohio Statutory Privileges Denied Line in Receivership

The Ohio Supreme Court in a recent decision held that the Ohio statute requiring the Public Utilities Commission to give notice and hold a hearing when an applicant requests a certificate to operate a motor coach line in territory already served by another line, and to allow the latter not less than 60 days to provide the service found by the commission to be necessary, does not relate to a line in receivership, the continued operation of which is problematical.

The decision affirmed an order of the commission granting a certificate of convenience and necessity to the Michigan-Ohio Bus Lines, Inc., for operations between Toledo and Sylvania after the Black Hawk Bus Lines, Inc., which held a certificate between those points, had become bankrupt and the receiver of the company had discontinued service when the Black Hawk motor coaches were repossessed under chattel mortgages. The case was brought by the C. C. Peck, Black Hawk Lines receiver, who sought to reverse the findings of the commission.



Co-ordinated Service on the New Haven at Hartford, Conn.

Pacific Motor Transport Co. Would Acquire Franchise

The Pacific Motor Transport Company, subsidiary of the Southern Pacific and the Pacific Electric, has filed with the California Railroad Commission an application for authority to purchase from the California Transit Company a motor truck freight franchise, covering operation over the route between Lone Pine, Cal., and Bishop, a distance of 62 miles. If the transfer of the franchise is authorized, motor trucks will be operated by the Pacific Motor Transport Company in co-ordination with rail service via the lines of the Southern Pacific between Los Angeles and Lone Pine.

Bill Proposing Mileage Tax Introduced in Mississippi

A bill to provide for further regulation of motor coach and motor truck lines, and to impose a mileage tax on such operations, has recently been introduced in the Mississippi Legislature. While common carrier motor vehicles in Mississippi are now regulated by the railroad commission, the present license fee for motor coaches is the same as that for privately owned automobiles, plus a tax of $2 per seat payable to each county through which common carrier operations are conducted.

The new bill proposes to replace these present assessments with a mileage tax of one-half cent per mile for motor coaches having a capacity of not more than 10 passengers, one cent for those with 10 to 20 passenger capacity and one and one-half cent for coaches with seats for more than 20 passengers. Commercial trucks now pay one and one-half times the fees charged to private vehicles of similar weight. Under the proposed law these truck assessments would be one and one-half cents per mile if the loaded capacity is less than 6,000 pounds and four cents if the weight is 6,000 pounds or more. The bill provides that the law if passed would become effective June 1.

Economy in Travel Stressed in Motor Coach Advertising

In a joint advertisement recently appearing in New York newspapers, the Eastern Greyhound Lines, the New England Transportation Company, and the People's Rapid Transit Company solicit motor coach patronage on the basis of "economy, comfort, and safety." The economy factor is particularly stressed in the advertisement in which the slogan, "Save as you ride," is put forth.

"No need to stay at home," the appeal continues. "Bus fares are within the means of everyone. To many points it's cheaper than driving your car." The remainder of the advertisement is a listing of "a few of the new low one way fares from New York."

Among the rates from New York quoted in this listing are: Baltimore, Md., $4.50; Boston, Mass., $4; Chicago, Ill., $15; Cleveland, Ohio, $12.50; Jacksonville, Fla., $20; Los Angeles, Cal., $51.50; Miami, Fla., $28· Pittsburgh, Pa., $10; Richmond, Va., $9; San Francisco, Cal., $56; St. Louis, Mo., $15; Toronto, Ont., $11.90; Washington, D. C., $5.50; Winston-Salem, N. C., $13.50.

Motor Services of the South African Railways in 1928-29

An increase over 1927-1928 of 26 per cent in the route mileage operated, 53 per cent in tne number of passengers carried, nearly 80 per cent in the tonnage of freight handled and 63 per cent in revenues were the outstanding developments in the highway operations of the South African Railways and Harbors Administration during the fiscal year ended March 31, 1929.

Passengers carried during 1928-1929 numbered 1,450,522, an increase of $502,979 over the previous fiscal year, while 112,791 tons of freight and 577,825 gal. of cream were handled, an increase of 49,992 tons and 187,234 gal., respectively, over 1927-1928. Although operations for the year resulted in a net loss of £3,134, this was a material reduction from the deficit of £11,111 experienced in 1927-1928. Revenues for 1928-1929 totaled £306,544, an increase of £119,072 over the revenues of £187,472 for 1927-1928, while operating expenses rose by £111,095, from £198,583 to £309,678.

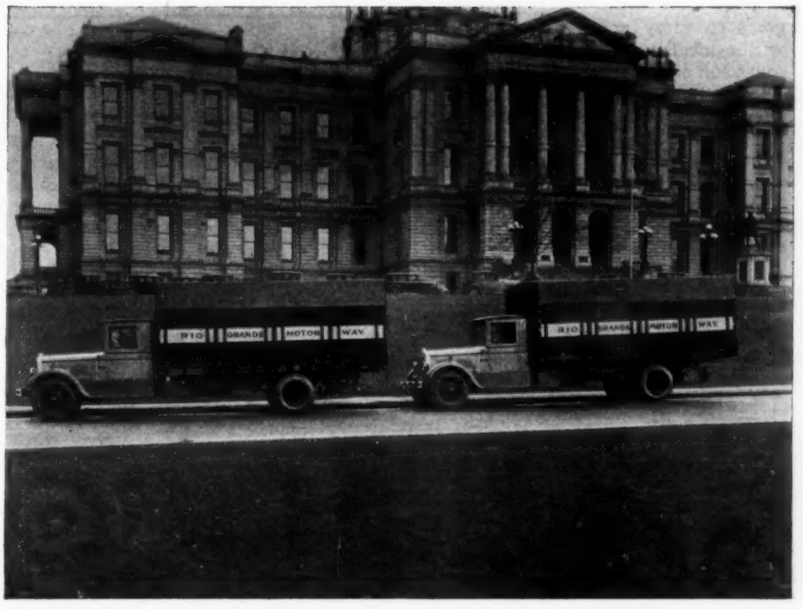
The number of vehicles in operation on March 31, 1929, totaled 352, an increase of 115 during the year. Motor coaches numbered 58 and trucks 90, with 204 vehicles available for combined passenger and freight traffic. The total mileage run was 4,144,368, as against 2,648,754 miles in 1927-1928.

Store door delivery services at Capetown, Durban, Johannesburg, Pretoria, Port Elizabeth, East London and Bloemfontein handled a total of 2,780,827 tons of freight, an increase of 13,121 tons over 1927-1928. The cost of this service was £460,540, an increase of £16,396 over the preceding year.

Questionnaire Seeking Cost Data for 1929 Study Mailed

The National Association of Motor Bus Operators has mailed questionnaires to a number of motor coach operating companies in an endeavor to develop statistics for its 1929 study of motor coach operating costs. The questionnaire is so designed as to make it possible for all carriers to furnish the information requested regardless of the system of accounts used.

The announcement expresses the hope that all members of the association will co-operate in making the study as complete as possible, and gives assurance that all returns are kept confidential as respects each company as the published figures are confined to groups in which it is impossible to identify any individual reporting firm.



Mack Trucks Operated by Rio Grande Motor Way, D. & R. G. W. Subsidiary

"The study of motor coach operating costs," the announcement also states, "is developing into one of our most important and popular activities and while the study completed last year was comprehensive enough to give a good cross section of operating experience in different parts of the United States it is not nearly as comprehensive or representative as we would like to have it."

N. C. Operators Required to Segregate Races in Coaches

The corporation commission of North Carolina is required by a recent decision of the Supreme Court of that state to adopt reasonable rules and regulations stipulating that motor coach lines, operating under franchises granted by the commission, provide equal, but separate, accommodations for white and negro passengers.

The ruling as reported in a recent dispatch from Raleigh, N. C., to the United States Daily said, "It has long been the settled policy of this state, promulgated through the legislative branch of the government, to have separation or segregation of the white and negro races with equal accommodations in the public institutions of the state and by public service corporations."

The case reached the courts when the commission dismissed a petition filed against certain motor coach operators by the transportation committee of the North Carolina commission on interracial co-operation. When this latter body appealed from the ruling to the superior court, that court held that the regulatory commission should have a reasonable length of time in which to work out the details of segregation, and that in the meantime motor coach operators would not be required to transport negro passengers. This ruling of the lower court was affirmed in the present decision of the Supreme Court.

Contract Relationship Held To Be Fictitious

(Continued from page 741)

stated to be common carriers, operating under certificates duly issued by this commission.

"Respondent concedes that he receives shipments from any person in Pittsburgh consigned to Burgettstown and vicinity, but claims that he will accept only those shipments which are consigned to merchants who are members of the Burgettstown Community Business Men's Association. However, there is evidence of at least one shipment to a consignee not a member of the association.

"The association, organized in February of 1928, has some 45 members and includes nearly all the merchants of the section. It is not incorporated and, while its purposes are formally stated in a general manner, two of its members on the stand stated that its purpose was to provide adequate trucking service to Burgettstown, and to enable its members to obtain respondent's service.

"Respondent has been operating under verbal and later written agreements with the individual members of the association which did not obligate the carriage of any particular amount of merchandise or require that all available shipments be given to respondent. Charges for shipments have been made in accordance with weight and have been paid either on delivery or at the end of the calendar month. In some cases shipments have been prepaid by the consigner in Pittsburgh and in others, paid by the consignee in Burgettstown.

"On September 1, 1929, four days before hearing on this complaint, the form of contract was changed, upon the advice of counsel that the prior arrangement was not legal. Since that date respondent has operated under a contract directly with the association, under which respondent

agrees to carry goods and merchandise for the members of the association, the association agreeing to pay therefor at the rate of 50 cents per 100 pounds, payable at the end of each calendar month. It is also provided specifically that the carrier is not the agent of the association, but an independent contracting party.

"Under this arrangement the association is responsible to respondent for all freight charges and, in turn, collects from its individual members their respective share thereof. Coincident with this change in the arrangements, the dues of the association have been increased from $1 a year to $1 per month in order to cover the increased cost of billing and collecting the charges from its members.

"The significant fact involved is that the association which purports to be the party for whom respondent is engaged in what he claims is private carriage, is not engaged in any business and does not own or have any financial interest in the goods transported, or have any connection with the transportation except the billing and collection of the charges. The situation created on the face of the contract in force is manifestly anomalous. The commission is unable to see any economic or business reason for it.

"In the light of the history of respondent's operations and the obvious unwieldiness of the arrangements, the commission is constrained to find that it is a fictitious relationship entered upon in an effort to evade the effect of reasonable orders of this commission, and that respondent is operating as a common carrier of freight and merchandise between Burgettstown and Pittsburgh."

Rail-Highway Service On the Pennsylvania

(Continued from page 741)

same points are New York-St. Louis, $38.06 (with upper berth $46.76); New York-Chicago, $32.70 (with upper berth $39.90); Philadelpnia-St. Louis $34.82 (with upper berth $42.92); Philadelphia-Chicago $29.46 (with upper berth $36.06).

Tickets for the combination service will be sold by both Pennsylvania and Greyhound agents. They will contain separate coupons covering, respectively, the motor coach portions of the journey, the rail trip and the Pullman accommodations. Close co-ordination of schedules between trains and motor coaches will be effected at all designated transfer points, special arrangements being made for blanket reservations of Pullman accommodations for the motor coach passengers.

The New York-St. Louis schedule calls for a motor coach run over the William Penn highway to Harrisburg, Pa.; the coach will leave New York at 9:00 a.m. and arrive in Harrisburg at 5:30 p.m. At the latter point passengers will transfer to a train departing at 6:16 p.m. for an overnight ride to Indianapolis, Ind. With the arrival of this train in Indianapolis at 8:05 a.m. the following morning, the passengers will be transferred for the second daytime motor coach ride. The motor coach will leave Indianapolis at 8:30 a.m. to arrive in St. Louis at 5 p.m. Thus the through run from New York to St. Louis is made in about 34 hours as compared with a schedule of about 27 hours for non-extra-fare trains between those points.

In the return direction a motor coach will be scheduled out of St. Louis at 7:00 a.m. and will arrive in Indianapolis, Ind., at 3:25 p.m. where at 5:00 p.m. passengers will board a train due in Harrisburg at 8:35 a.m. the following morning. At 10:35 a.m. a motor coach will leave Harrisburg to arrive in New York at 7:25 p.m.

The New York-Chicago schedule calls for a motor coach departure from the former at 12:01 p.m. to arrive in Harrisburg at 8:15 p.m. From Harrisburg a train will leave at 10:32 p.m. and arrive in Lima, Ohio, at 10:38 a.m. the following day. The motor coach will leave Lima at 11 a.m. and arrive in Chicago at 6:30 p.m. In the return direction the transfer points, Lima and Harrisburg, will be the same—the Chicago-Lima motor coach will leave the former at 9:30 a.m. while the Harrisburg-New York motor coach will arrive in the latter at 7:10 p.m. the following day.

From Philadelphia the motor coach on the St. Louis route will depart at 8 a.m. and proceed over the Lincoln highway to Pittsburgh where at 11:53 p.m. passengers will transfer for an overnight train journey terminating in Indianapolis at 7:25 a.m. the following day. The Indianapolis-St. Louis motor coach will leave the former at 8:30 a.m. and arrive at destination at 5:00 p.m. In the return direction the motor coach, leaving St. Louis at 7:00 a.m., will carry passengers to Richmond, Ind., arriving there at 6:33 p.m. At 9:20 p.m. the co-ordinating train leaves to arrive in Pittsburgh at 6:50 a.m. the following day. The Pittsburgh-Philadelphia motor coach will depart at 8:00 a.m. and arrive in Philadelphia at 11:17 p.m.

The Philadelphia-Chicago schedules call for but one motor coach run—that between Philadelphia and Pittsburgh both eastbound and westbound. The overnight train ride between Pittsburgh and Chicago completes the journey.

Court Overrules Missouri Commission in M. P. Case

The order of the Missouri Public Service, which denied the application of the Missouri Pacific for authority to substitute motor coach service for local passenger train service between Pleasant Hill, Mo., and Joplin, was set aside by the Cole county circuit court at Jefferson City, Mo., on February 11. The court held that the commission, in denying the petition of the railroad was arbitrary and unreasonable. The commission is expected to appeal to the supreme court.

Motor Coach Regulation Bill Before the House

(Continued from page 742)

perienced in motor-vehicle transportation problems. If the board or governor of any State fails to designate any member the matter is to be handled by the commission. Any such joint board is to be, as declared in the act, an agency of the Federal Government while acting under the provisions of this act. The expenses, but not the salaries, of joint-board members are to be paid by the Federal Government.

"When any matter is heard and decided by a member or examiner, or by a joint board, such member, examiner, or joint board is to file with the commission its recommendation for an appropriate order, and after having been filed with the commission 10 days such recommended order becomes the order of the commission, except that the commission may before the expiration of such time stay or postpone such recommended order. A review of any such matter by the commission is provided for. No time limit for review is fixed, and it is contemplated that this feature will be taken care of by regulations of the commission. The commission will be under a duty to grant such review as may be necessary or proper to carry out the purposes of the act. The commission is authorized to review any such matter on its own initiative. It is important to note that the orders recommended by an examiner or member, or a joint board, do not become effective as orders of the member, examiner, or joint board, but as orders of the commission, either after the expiration of the 10-day period above referred to or by substitution of the commission's own order upon review.

"Subsection (g) authorizes the commission to confer with and to hold joint hearings with State authorities in connection with any matter arising under the act, and authorizes the commission to avail itself of the cooperation, service records, and facilities of any State or of any officials thereof in the enforcement of the act, this provision being deemed advisable because of the close relation which interstate motor vehicle transportation bears to intrastate operations of the same character.

"In subsection (h) it is provided that relief from final orders of the commission may be had (just as in the case of final orders under the interstate commerce act) by extraordinary remedy, the suit to be determined by the statutory court of three judges in a proper case."

Section 1 is a definition of terms and sets forth that

"The term 'common carrier by motor vehicle' means any common carrier of persons operating motor vehicles for compensation in interstate or foreign commerce.

"The term 'charter carrier by motor

vehicle' means any carrier of persons operating motor vehicles for compensation in interstate or foreign commerce, not as a common carrier. Carriers of persons operating motor vehicles hired or leased for a specific trip or trips shall not be considered common carriers for the purposes of this paragraph or of the preceding paragraph.

"The term 'motor carrier' includes both a common carrier by motor vehicle and a charter carrier by motor vehicle."

Section 2 makes it the duty of the commission to supervise and regulate common carriers by motor vehicle as provided in the act, and to that end the commission may establish reasonable requirements with respect to continuous and adequate service at just and reasonable rates, a uniform system of accounts and reports, qualifications and maximum hours of service of employees, safety of operation and equipment, comfort of passengers, and pick-up and delivery points whether on regular routes or within defined localities or districts.

Carriers by motor vehicle in interstate or foreign commerce on any public highway are forbidden to operate without a certificate of public convenience and necessity, except for a period of 90 days after the passage of the Federal Motor Carrier Act, 1930, if application for a certificate is made within that period.

There is also a provision that "nothing contained in section 500 of the transportation act, 1920, shall be construed as expressing a preference by Congress for rail or water transportation over transportation by motor vehicle or to affect in any manner the issuance of a certificate of public convenience and necessity under the provisions of this act; and nothing contained in this act shall be construed as a declaration by Congress of the relative importance to the public of the several kinds of transportation." The commission is directed in the administration of the act, to preserve competition in service "so far as consistent with the public interest."

Section 500 of the Transportation Act which is referred to above declares it "to be the policy of Congress to promote, encourage, and develop water transportation, service, and facilities in connection with the commerce of the United States, and to foster and preserve in full vigor both rail and water transportation."

Provision is made for requirements that operators shall observe published tariff rates, which may be changed only on thirty days' notice. Any person, corporation or state board may make complaint to the commission that rates are or will be unjust or unreasonable and if it is decided that the rate or charge is or will be unjust or unreasonable "an appropriate order shall be issued in conformity with such decision." No rate may be held to be unjust or unreasonable, however, "on the ground that it is unjust to a competing carrier engaged in a different kind of transportation."

The first of the amendments adopted by the House was proposed by Chairman Parker himself, and was designed to place all sight seeing motor coaches on the same level in the consideration of governmental control. The second was offered by representative Lea of California and provided that wherever the term "common carrier by motor vehicle" appeared in the bill, it would mean over fixed routes as between fixed termini. These two amendments were adopted in the course of discussion on March 14.

Commission Upheld in N. Y. C. Trucking Case

(Continued from page 743)

through the use of bills of lading and waybills, exactly as all other classes of freight.

"By the use of these trucks the New York Central Railroad Company cannot and has not divested the carriage of the features of a common carrier transaction. It still holds itself out to the public as a common carrier of this freight which it transports upon motor vehicles. It receives this freight in exactly the same way at its freight stations that all other freight transported by its railroad is received. As between the public and the New York Central Railroad Company the transaction is exactly the same as that of transportation by rail. Hence the New York Central Railroad Company under this record is not only a common carrier for hire, but with reference to this particular freight it is a common carrier for hire, and the contract of carriage never ceases to be a contract of common carriage.

"It is further urged that the order was void in that it required the respondent to cease and desist from the haulage of interstate traffic. We do not so read the order. The order compels the New York Central Railroad Company to comply with the statutes with reference to certificate and taxes if it transports its freight by motor vehicles. It has been held by this court that while the States may not shut out from interstate traffic motor transportation companies which operate in such traffic, they may require such operators to obtain certificates, pay taxes for the use of the highways, carry insurance and comply with other police regulations in so far as the same do not involve a direct burden upon interstate commerce. . . ."

New Jersey Lines Merger Approved by Commission

The Board of Public Utility Commissioners of New Jersey in a recent order approved the acquisition of several motor coach lines in that state by the Public Service Interstate Transportation Company, subsidiary of the Public Service Corporation of New Jersey (see *Motor Transport Section*, December 28, 1929, page 1532). The merger which became effective on January 1, involved the consolidation of 18 motor coach lines operated by 21 companies formerly controlled by the O. G. Schultz interests in New Jersey and Pennsylvania.

The companies involved under the Commissioners' decision are Schultz Management, Nelson & Johnson Transportation Company, Worth Motor Bus Corporation, Williamstown-Philadelphia Bus Company, Clementon Transit Company, P. & G. Transportation Co., Inc., Barrington-Philadelphia Bus Company, Philadelphia-Hammonton Bus Company, T. & S. Bus Company, Twin City Transportation Company, Union Bus Company, White Way Tours and Shore Service, Inc.

Orders for Equipment

THE HUNTINGTON & BROADTOP RAILWAY has purchased a Type Y parlor coach from the General Motors Truck Company.

THE MISSOURI PACIFIC TRANSPORTATION COMPANY has received six Type W observation coaches from the General Motors Truck Company.

THE PENNSYLVANIA GENERAL TRANSIT COMPANY has accepted delivery of one Type W observation coach from the General Motors Truck Company.

THE CANADIAN GREYHOUND LINES have received three Type W observation coaches from the General Motors Truck Company.

Motor Transport Officers

C. G. Haney has been appointed operating manager in charge of transportation and mechanical forces at the motor coach garages of the Philadelphia Rural Transit Company.

J. D. Watson, district traffic manager for Pickwick Stages System, has been appointed general traffic manager of the Pacific division and **H. W. Porter,** chief clerk in the traffic offices, has been promoted assistant general traffic manager under Mr. Watson.

Edward Krummen, division superintendent of the Southwestern Transportation Company, with headquarters at Little Rock, Ark., has resigned to engage in other business. **M. D. Leeper,** assistant division superintendent, with headquarters at Tyler, Tex., has been transferred to Little Rock.

T. Stone, superintendent of maintenance and equipment for the Pickwick Stages System, has been appointed general manager of the Pacific division of the Pickwick Greyhound Lines, with headquarters as before in Los Angeles, Cal., and will be succeeded by **H. E. Clemens,** superintendent of maintenance and equipment for Motor Transit Company.

L. D. Jones, has been appointed general manager, and **Earl A. Bagby** general counsel and executive assistant, of the following companies: Southern Pacific Motor Transport, Calistoga & Clear Lake Stage, California Parlor Car Tours,

Union Auto Transportation, Peninsula Rapid Transit, California Transit, Pacific Auto Stages, Inc., Pickwick Stages System, and the Golden Gate Stages, with headquarters at Los Angeles, Cal. **J. H. Hodge** has been appointed assistant general manager of the Southern Pacific Motor Transport, California Parlor Car Tours, Union Auto Transportation, California Transit Company, and Pickwick Stages System, with headquarters at Los Angeles, Cal. He will have jurisdiction over the territory from El Paso, Tex., to, but not including San Luis Obispo, Cal., to and including Fresno, Cal.

E. Wanamaker, electrical engineer of the Chicago, Rock Island & Pacific, at Chicago, Ill., has been appointed vice-chairman of the Motor Transport Division A.R.A., and chairman of the rail motor car section, to succeed **R. L. Fairbairn,** manager of the passenger service bureau of the Canadian National, at Montreal, Que., who has resigned. Mr. Fairbairn had served in the foregoing positions since the creation of the

E. Wanamaker

division. Mr. Wanamaker was born on November 15, 1880, at Bethany, Mo. He entered railway service in August 1899, with the Chicago, Burlington & Quincy and subsequently to 1907 was engaged in railroad, mine and mill construction work and as a marine engineer. From 1907 to 1910 he served with the United States Reclamation Service in connection with the work of driving the Gunnison tunnel in Colorado, and held the position of superintendent of power and machinery. In 1910 he entered the employ of the Arnold Company of Chicago. With this company he spent several years as engineer and superintendent of construction, engaged in the construction of railroad repair shops, power plants, electric railways, hydroelectric power plants, etc. During this time the new St. Louis San Francisco shops at Springfield, Mo., were built and here he was superintendent of temporary construction and had charge of the installation of all electrical and mechanical machinery. In 1913, Mr. Wanamaker became chief engineer of the Chicago, Rock Island & Pacific, and on December 1, 1914 he was promoted to the position of electrical engineer in charge of all electric lighting and power equipment in railroad shops, car lighting, train control, electric welding, etc.

R. L. Fairbairn

During the war he became deeply interested in the subject of electric welding and his subsequent experiments in this field have resulted in his being recognized as an authority on welding, particularly in its application to construction and maintenance in railroad work. He has been actively interested in the work of the Rail Motor Car section since the formation of the Motor Transport division.

Mr. Fairbairn was born on November 24, 1880, at Stillwater, Minn. In July 1899, he entered railway service with the Great Northern and remained in their employ until June 1, 1908. With them he served in the offices of the auditor of passenger receipts and that of the passenger traffic manager, and as assistant and later chief rate clerk in the passenger department. On June 15, 1908, he became connected with the Canadian Northern (now part of the Canadian National) and from that date until the present time has held the positions of chief clerk in the passenger department at Winnipeg, Man.; district passenger agent, at Saskatoon, Sask.; assistant general passenger agent, lines east of Port Arthur, at Toronto, Ont.; general passenger agent, eastern lines; assistant passenger traffic manager; and now manager of the passenger service bureau.

Among the Manufacturers

Crawford Brown has been appointed manager of the Bronx (New York City) factory branch of the Autocar Company.

The Long Island City branch of the **LaFrance-Republic Sales Corporation** has moved to a new location at 32-37 Queens boulevard.

Brawn C. Sproul has been appointed traffic director of the Durant Motors Inc., of Lansing, Mich., succeeding **W. J. Bailey,** resigned.

C. O. Woody, former district manager for the Hicks Rubber Company, has been appointed direct factory representative in the state of Texas, for the Dayton Rubber Manufacturing Company.

The Russell Manufacturing Company of Middletown, Conn., will open a new branch and warehouse in the Interim Warehouse building, Detroit,, Mich. on April 1. **F. Fuhrman** will be division manager in charge of this new branch, with **P. H. Burns** as assistant manager. The territory of the branch will comprise the states of Ohio, West Virginia, Kentucky, Indiana, Michigan, southern Illinois, and a part of Pennsylvania.

W. R. Angell, who has been connected with the Continental Motors Corporation, Detroit, Mich., for many years, having served as secretary, vice-president, and chairman of the finance committee, has been appointed president, succeeding **R. W. Judson,** who has been elected chairman of the board. **Roger Sherman** and **James H. Ferry** have been appointed vice-presidents. **B. F. Tobin, Jr.** has been elected treasurer, succeeding **R. M. Sloane,** resigned.

The Westinghouse Air Brake Company and the Bendix Aviation Corporation have joined in the formation of a new company to be known as the **Bendix-Westinghouse Automotive Air Brake Company,** the entire capital stock of which is to be held by the Bendix Aviation Company and the Westinghouse Air Brake Company. The new company will continue the operation of what has heretofore been the automotive division of the Westinghouse Air Brake Company, and will supply Westinghouse air brake equipment for motor coaches, trucks, and other types of automotive vehicles, Westinghouse will continue to manufacture the automotive air brake equipment for the new company. Officers of the new company are: **Vincent Bendix,** president, **S. G. Down,** vice-president, and **W. J. Buettner,** treasurer.

Trade Publications

Johns-Manville Corporation, New York, have recently issued a booklet on "Friction Materials for Buses" which gives an outline of the development and advantages of Bus Blocks. A description of other types of brake lining and woven and moulded clutch facings is also included.

The North East Electric Co., Rochester, N. Y. has issued a booklet covering heavy duty electric equipment which is particularly adapted to motor coach and truck application. The large capacity generators for motor coach application are described in detail.

The General Electric Company has recently issued a pamphlet entitled "Gas Electric Drive." In it are outlined the advantages of gas electric drive for motor coaches, and there are also included data concerning several large motor coach fleets.